

## Chapter 4

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### Environmental Impacts



## 4.1 INTRODUCTION

This section forms the scientific and analytic basis for the alternative comparisons. Two alternatives are evaluated: Alternative A (Proposed Action) where 21 LUPs would be amended to update fire management direction; and Alternative B (No Action) where the current LUPs and fire management direction would be maintained. The discussion in this chapter includes the potential environmental impacts, and uncertainties of these impacts, of the Proposed Action and continued existing conditions under the No Action Alternative.

This chapter is organized with discussions of impacts on each resource (as defined in the BLM Land Use Planning Handbook H-1601-1, as amended) under both the Proposed Action and No Action scenarios. The analyses of impacts of fire management actions on each resource are discussed in a short and long-term context. For surface and groundwater, soils, and cultural resources, a general description of fire's potential effects is provided in order to give context from which to analyze and contrast the impacts of the management direction represented by the Proposed Action, and within the No Action Alternative. A cumulative effects section is presented at the end of the Chapter, which analyzes both the Proposed Action and No Action Alternatives.

The fire management actions that were analyzed as potentially impacting resources of concern are wildfire and suppression, wildland fire use, prescribed fire and non-fire fuel treatments, including mechanical treatments and seeding. Chemical treatments are another type of non-fire fuels management activity, yet it is not regularly employed by the BLM for hazardous fuel treatments. Since the activity occurs on a comparatively small average acreage (less than 4,500 acres per year) of the planning area and there are Resource Protection Measures that protect sensitive resources from potential effects of chemical treatments, no short- or long-term impacts to resources are described (Pollet 2004).

Some key assumptions are required to lay the framework for meaningful analyses of impacts. These assumptions include:

- Planned fire and non-fire fuel treatments in the No Action Alternative would occur, but they would be substantially less than the Proposed Action and would not typically be for the primary purpose of hazardous fuels reduction or community protection.
- As it is used in this analysis, short-term is considered 0 to 5 years, and long-term is 6 to 15+ years.
- The No Action's primary fire suppression focus is on full suppression. The Proposed Action's focus is primarily the same, initially, due to the existing FRCC of vegetation in the State. However, the Proposed Action does allow for a less stringent suppression approach through the use of an appropriate management response. Even if the Proposed Action is implemented, a measurable reduction in occurrence, severity or size of wildfires is not expected in the short-term. The difference in impacts between the alternatives would be primarily in the long-term trend of wildfire behavior and reduced risks to communities and ecosystems.
- Wildland fire use is not a major component of treated acres in the Proposed

Action because of the limitations related to the inability to rehabilitate following wildland fire use and fragmented land ownership. Wildland fire use is not an option in the No Action Alternative.

- Prescribed fire and non-fire fuel treatments are typically planned in areas with a low risk of noxious weed infestation or are followed by seeding to reduce the risk.

The potentially impacted resources analyzed below are: air; soil and water; vegetation; special status species; fish and wildlife; cultural resources; visual resources; naturalness; solitude and primitive recreation; forestry; livestock grazing; recreation and visitor services; special designations; and socio-economics. The issues associated with these resources to be analyzed in this document are identified both in Chapter 1, Section 1.7 and in **Appendix A**.

## **4.2 ALTERNATIVE A: PROPOSED ACTION**

As stated in Chapter 2, the Proposed Action would include a fire management program that incorporates suppression, wildland fire use, prescribed fire, non-fire fuel treatments (e.g., biological, mechanical, seeding, and chemical treatments), ESR actions, and community protection.

### **4.2.1 Air**

Wildland fires are a source of air pollutant emissions during combustion of vegetation. The amount of emissions depends on the size and intensity of the fire, the fuel type and moisture content, and available fuel load (Sandberg et al. 2002). The level of resulting air quality impact depends on the amount and duration of emissions, atmospheric dispersion conditions, and terrain. The magnitude and extent of air quality effects resulting from the Proposed Action are complex to quantify due to the variability of potential fire management activities and the period of time each could occur.

The Proposed Action includes several air quality Resource Protection Measures to minimize air quality impacts. Potential impacts, both long- and short-term, would be minimized through action specific analysis and permitting and coordination efforts with the Utah Interagency Smoke Management Program to ensure compliance with all local, state and federal regulations, as described in Chapter 3. With these laws and protection measures in place, fire management activities would not unlawfully exceed air quality standards or impact NAAs or other sensitive areas in Utah due to the Proposed Action. However, circumstances beyond the BLM's control (i.e., uncontrollable wildfires) may impact air quality, but these acts of nature are outside the scope of the Proposed Action.

#### **SHORT-TERM**

In contrast to the current widespread management direction of full suppression of wildfires, the Proposed Action would potentially decrease the level of suppression being used on a wildfire through an AMR. The AMR may also allow for wildland fire use in appropriate areas. Under the Proposed Action's wildland fire scenarios, slightly more acres may be burned and an increase in smoke and particulate emissions may result. For wildland fire use, emissions would be required to be within regulatory levels. Therefore, impacts on human health are not expected.

Planned and permitted prescribed fire and non-fire fuel treatments can be effective methods for reducing heavy fuels loads that could adversely impact air quality during a

wildfire. When properly executed, managed fires would be much smaller and involve less combustion and would occur when the fuels characteristics, as well as weather conditions, are optimal to enhance efficient vegetation consumption and air pollutant dispersion (NWCGb 2001). The anticipated increase in prescribed fire would be coordinated with the SMP program coordinator to prevent exceedances of air quality standards and to minimize impacts to NAAs and other sensitive areas (Utah Interagency Smoke Management 2004). Impacts due to prescribed fire events are anticipated to increase slightly from current conditions, but each event would be planned and undergo environmental review to quantify and minimize those impacts.

The anticipated increase in mechanical treatments (including seeding) could cause short-term increases in exhaust and fugitive dust from the use of mechanical equipment during and immediately after application of treatments; however, mechanical treatments are planned and undergo environmental review to ensure compliance with air quality standards and to minimize impacts to sensitive areas. By utilizing options for fuels reduction other than fire, impacts to air quality, NAAs, and other sensitive areas could be reduced.

#### LONG-TERM

The Proposed Action would decrease the potential for severe and uncontrollable types of wildfires and create a trend toward a more "natural" fire occurrence on BLM-managed lands, which would enable the agency to manage wildfire and associated emissions more effectively. These efforts would decrease the potential for negative impacts to human health.

The use of planned fire and mechanical treatments would continue to have a minor impact on air quality. The planned nature of these events would allow the BLM to time and locate actions for optimal control of emissions. As discussed above, the major impact from these actions is the trend created to decrease occurrence of severe and uncontrollable wildfires.

#### **4.2.2 Soil and Water**

Resource Protection Measures have been built into the Proposed Action to protect soil and water resources. These measures would be implemented during wildland fire suppression activities, wildland fire use, prescribed fire and non-fire fuel treatments and emergency stabilization and rehabilitation actions and would limit and minimize potential impacts.

##### **4.2.2.1 Soil**

Due to the interconnectedness and interdependence of issues relating to erosion and runoff, and soil quality and health, impacts are collectively analyzed. This allows for a more complete analysis and assessment of potential impacts. There are no anticipated effects on soil source materials from fire management actions and no further discussion of this issue will be presented.

#### GENERAL DESCRIPTION OF FIRE'S EFFECTS ON SOILS

A general understanding of how fire can affect soils is necessary to provide context for analysis of this alternative's fire and fuels management proposals.

Fires affect soils primarily by consuming or charring live or dead vegetation cover, litter, and organic soil layers. Fire may also alter soil chemical properties, post-fire soil temperatures, microorganism populations and their activity rates, erosion rates, and may temporarily increase nutrient availability (NWCGa 2001). The degree of short-term effect on these soil characteristics depends on amount of vegetation, and thickness and density of litter and organic layers and also depends on the intensity of fire (i.e., temperature). Soil texture and type, soil moisture at the time of burning, and depth and duration of heat penetration into soil horizons are also critical factors (NWCGa 2001). Appreciable changes in soil mineral fractions would not be anticipated as a result of a low severity fire (Beaton 1959; Summerfield 1976). Soil depth influences the quantity of material available for erosion and may therefore affect the magnitude of erosion.

The single most important factor in topsoil and nutrient loss is the timing of vegetation recovery coupled with the severity of precipitation events. If post-fire rains are relatively gentle, some nutrients released by a fire may be reabsorbed; however, these nutrients are generally lost during severe, erosive rainfall.

The potential for excessive post-fire erosion depends on the soil types in the burn area, the pattern of burn intensities, the amount of residual vegetation and organic matter, and the rate and amount of vegetation recovery and slope. Soil microorganisms (biological crusts) may be impacted by surface disturbances that compact or disaggregate these features. Disturbance of biological crusts on coarse-textured soils can increase the potential for wind erosion.

Wetland and floodplain soils may also be affected by fire. Due to the high water content of wetland and some floodplain soils, penetration of heat by a surface fire can be dramatically less than in mineral soils. Since many wetland soils are composed of significant amounts of organic materials, and organic matter has a lower thermal diffusivity than mineral soils, penetration of heat can be furthered reduced. However, organic soil layers can become dry enough to burn. Considerable amounts of heat can be generated when organic soils burn, particularly in drought situations when the fire burns deeply into organic layers.

#### SHORT-TERM

Under the Proposed Action and in consideration of how naturally-ignited wildland fires are managed (appropriate management response vs. suppression only), it is possible that slightly more acres may be burned by wildland fire. An increase in the loss of vegetative cover to wildland fire could lead to the loss of soil structure and reduced porosity of soils in these impacted areas. This reduction in porosity and structure could result in a modification and reduction in infiltration rates and increased erosion and runoff (Ralston and Hatchell 1971). Wildland fire events would be subject to an appropriate management response and an aggressive initial attack would be considered where expected fire severity could adversely impact sensitive soils. Some level of ground disturbing activities associated with suppression and wildland fire use efforts would still occur regardless of the AMR employed. The proposed Resource Protection Measures would be implemented to minimize suppression and wildland fire use impacts to soils and vegetative cover, as well as to address indirect impacts associated with soil loss and the potential for sediment loading. Erosion and sediment

controls and any revegetation may be proposed as post-fire treatments that would serve to contain and control soil loss and would serve to stabilize these sites.

The emphasis on managing for low severity fire conditions in wetlands and riparian zones would decrease the frequency and intensity of future wildfire in these areas. High severity fires in wetlands and riparian areas are commonly associated with invasive non-native species, such as tamarisk, along river corridors. The increased ability to perform planned actions in wetland and riparian areas would improve future prospects for native species contributions to shade retention, woody debris delivery, stream-bank stability, pore water content and nutrient input. A corresponding decrease in the effects of severe fires would also be apparent in preserved organic soil horizons, ground litter and the ability of wetlands and riparian areas to cycle nutrients back into the local ecosystem.

Incorporating soil protection measures in project design and implementation would limit impacts to soils from prescribed fire. Under the Proposed Action, the mechanical removal of fuels prior to prescribed burning would typically produce lower temperature fires, thus resulting in fewer direct and indirect impacts on soil.

Resource Protection Measures would also minimize the impacts to soil resources associated with heavy equipment used for mechanical fuel treatments (e.g. increased soil compaction, increased runoff, reduced infiltration, damage to sensitive and organic soils).

Indirect impacts include potential soil loss from wind and water erosion. Under the Proposed Action, there may be fewer indirect impacts from fire suppression efforts, but there would be increased use of prescribed fire and mechanical treatments, which could result in greater short-term soil disturbance and erosion than current activity. The Proposed Action, however, would allow more flexibility in planned activities, which would allow implementation of Resource Protection Measures to reduce potential effects to soil.

#### LONG-TERM

A trend toward DWFC would decrease the size of wildfires, their severity and burn duration. Less severe wildfires would result in fewer impacts to soil characteristics including microbial populations, soil temperatures and the chemical and physical structure of the soil than current management. The flexibility of the Proposed Action would continue to allow for high levels of suppression in areas where fire has not played a considerable role in the past and in areas with sensitive soils.

Planned fire management and fuel reduction actions, under the Proposed Action, would be implemented to improve the soil resources and reduce erosion potential in the long-term by fostering a healthy, native understory. A decrease in the potential for destruction of biological crusts due to severe fire events would also reduce the erosion potential and increase fixation of atmospheric nitrate. Planned actions of prescribed fire and non-fire fuel treatments under the Proposed Action would reduce the likelihood of severe wildfires that result in soil structure loss and altered porosity and infiltration rates. The Proposed Action would also allow more flexibility than the No Action Alternative in implementing and timing planned management actions that would protect and enhance wetland and riparian soils. Over time, as fire returns to a more

natural pattern, there would be fewer indirect impacts from large, severe wildfires including potential sedimentation of streams and reservoirs from wind and water erosion and fugitive dust from wind erosion.

#### 4.2.2.2 Water

##### GENERAL DESCRIPTION OF FIRE'S INTERACTION WITH SURFACE AND GROUNDWATER

A general understanding of how fire can affect surface water and groundwater is necessary to provide context for analysis of this alternative's fire and fuels management proposals.

Fires reduce vegetation cover, especially in the short-term, which intercepts precipitation before it hits the soil surface. The lack of vegetation cover on burned or areas could allow precipitation to increase surface runoff, soil loss and sediment input to surface waters. These sites may have lower soil-water infiltration rates, which increase surface runoff and decrease soil moisture available for plants. The seasonal timing, size, duration and intensity of fires greatly influence the magnitude of impacts.

Burned watersheds generally respond to rainfall faster than unburned watersheds, producing more "flash floods" (Anderson et al. 1976). Water repellent soils and cover loss cause flood peaks to arrive faster, rise to higher levels and entrain greater amounts of bedload and suspended sediments. Flood warning times are reduced for "flash" flows and the high flood levels can be devastating to property and human life.

Fire can have many impacts on stream habitats including changes in soil erosion and sediment loads, nutrient loads and water temperature. Sediment from accelerated soil erosion and elevated levels of nitrogen and phosphorous from ash are common in water after wildfires (NWCGa 2001). Sediment input may reduce the area suitable for spawning or smother fish eggs with fine materials. Removal of streamside vegetation increases water temperatures, increases streambank erosion and reduces the available streamside habitat (Monsen et al. 2004).

In relation to groundwater, fire consumes accumulated surface litter and vegetation, altering infiltration by exposing soils to raindrop impact or creating water repellent conditions (DeBano et al. 1998).

##### SHORT-TERM

**Surface Water** Under the Proposed Action, the potential slight increase in wildland fire acres could increase runoff, erosion and stream temperatures. Nutrient concentration and turbidity increases in surface waters through increases in erosion and runoff, which carry nutrients and excess sediment into water courses from burned areas are possible. Under the Proposed Action, fires with potential for high severity in aquatic habitats (e.g., riparian zones and wetland areas) would generally be suppressed. This would minimize impacts to floodplain and riparian functions and values. There are no expected impacts to watershed drainage patterns.

The prescribed fire and non-fire fuel treatments would increase under the Proposed Action. Vegetation disturbance associated with these actions would be evaluated through an environmental planning and review process that would minimize impacts related to increases in surface runoff, soil loss and sediment input to surface waters.

Often these impacts are short-term and conditions return to pre-fire levels once vegetation is re-established.

The Proposed Action would allow more flexibility in planned activities to manage fuel loads and would implement Resource Protection Measures to reduce potential effects to water resources. Potential impacts to water resource issues would be considered before implementing prescribed burns, non-fire fuel treatments or emergency stabilization and rehabilitation efforts.

### **Groundwater**

The Proposed Action is not expected to create impacts that differ substantially from the No Action in the short-term. However, minor impacts on groundwater quality may occur due to altered water absorption patterns from soil compaction due to mechanical equipment and from a decrease in vegetation cover following wildfire or fuel treatments. Alternatively, infiltration could decrease after a fire due to the formation of a hydrophobic soil layer. Altered water infiltration rates could potentially temporarily increase or decrease the chemical levels (e.g., dissolved solids) in shallow aquifers (Gee et al. 1992, Allison et al. 1994).

**Water Quality** The impacts to water quality are similar to those discussed in the preceding surface water section. Planned actions would have minimal impacts on impaired waters through implementation consistent with compliance strategies for restoring or maintaining the restoration of water quality impaired [303(d) listed] waterbodies. Resource Protection Measures would restrict activities in the vicinity of sensitive areas such as wetland and riparian areas, floodplain areas and impaired water bodies (i.e. 303(d)-listed) in order to reduce further degradation of the surface water conditions. The Proposed Action would not affect support for beneficial uses.

### **LONG-TERM**

**Surface Water** Potential for long-term beneficial impacts to watershed condition would be greater under this alternative in comparison to current management (No Action). Overall, watershed conditions would improve by reducing the risk of high severity wildfire and promoting native vegetation types.

Wildland fires would be smaller and less severe resulting in fewer impacts to storm flows and nutrient and sediment loads. The burning of riparian and wetland areas would generally be avoided, however, low intensity fires may be allowed to burn to reduce the likelihood of a future severe fire which would cause greater damage to those areas. A trend towards fewer severe wildfires would increase soil stability and would enhance overall bank and channel stability and Proper Functioning Condition of the watershed. Some areas would have a more sustainable supply of woody debris or native stream bank vegetation, which would also increase bank stability. Floodplains would have fewer disturbances from severe wildfires, which would allow greater stability and increased functionality of floodplains, including decreasing the impact of flashfloods.

Planned fire actions, under the Proposed Action and eventual restoration of natural fire regimes, would improve water resources and reduce erosion potential in the long-term by fostering a healthy, native understory. The Proposed Action would allow more flexibility in implementing and timing planned actions that would protect water resources.



**Groundwater** A trend towards fewer large, severe wildfires, that otherwise may cause damage to soil resources and the resultant impacts to groundwater, would occur. This is related to a reduction in the alteration of infiltration rates and would be realized through more vegetation surface cover and root zone presence and less fire-caused hydrophobicity.

**Water Quality** The impact from the Proposed Action should result in improvement of the restoration of water quality impaired [303(d) listed] waterbodies. The potential for severe fires in sensitive areas such as wetland and riparian areas, floodplain areas and around impaired water bodies (i.e. 303(d)-listed) would decrease leading to the ability of those areas to maintain their functional ability to filter out dissolved solids and suspended solids, and promote a more stable baseflow condition through infiltration of surface flows.

#### 4.2.3 Vegetation

A goal of the Proposed Action is to move vegetation with a FRCC of 3 and 2 toward a more ecologically sustainable FRCC 1 over a multi-year period. As the trend toward DWFC progresses there would be less risk of losing key ecosystem components from severe wildfire. The need for post-fire stabilization, rehabilitation, and restoration to control soil erosion, the loss of wildlife habitat and other values at risk would also decrease.

#### SHORT-TERM

**Salt Desert Scrub** In the short-term, wildfire suppression and lack of wildland fire use in this vegetation type would help to limit further degradation due to expansion. Under the Proposed Action, aggressive seeding after wildfire and limited prescribed fire use in conjunction with seeding for invasive species control efforts would help to trend this vegetation type toward a lower FRCC. Non-fire fuel treatments, such as seeding following surface disturbance, would also help to prevent further expansion of invasive species and deterioration of this vegetation type toward a higher FRCC.

**Pinyon and Juniper Woodland** In the short-term, wildfire suppression and lack of wildland fire use in degraded pinyon and juniper areas (FRCC 3) would help to limit further invasive species invasion and expansion, but would not decrease juniper expansion or promote recovery of pre-settlement vegetation types lost to juniper encroachment (e.g., sagebrush, perennial grasslands). Aggressive seeding with native species following wildfire in FRCC 3 areas would help to trend these areas toward a lower, more desirable FRCC by limiting or reducing cheatgrass invasion and expansion and promoting recovery of historic vegetation types. Wildland fire use and prescribed fires in FRCC 2 lands (i.e., areas encroached by juniper but still with intact native understories) would help to trend areas toward recovery of the pre-settlement vegetation types and lower FRCC. Non-fire fuel treatments such as mechanical removal of pinyon and juniper from FRCC 2 and 3 areas would also promote recovery of pre-settlement vegetation types and trend these areas toward a lower FRCC.

**Sagebrush** In the short-term, suppression of wildland fires in FRCC 3 and FRCC 2 sagebrush areas with depauperate native understories or a moderate or higher threat of cheatgrass invasion, followed by aggressive seeding with native grasses and forbs, would help to limit further degradation due to cheatgrass invasion and expansion. This may also begin to lower the FRCC in areas where wildfires occur following successful

post-fire seeding efforts. Since most low-elevation sagebrush FRCC 2 areas are at increased risk of cheatgrass invasion and expansion, full suppression efforts would generally be applied which would greatly limit the acreage of low-elevation sagebrush that may be improved via wildland fire. Since high-elevation FRCC 2 sagebrush areas are more likely to have intact understories and a lower threat of cheatgrass invasion, they would benefit to a greater extent from wildland fire use and prescribed fire. Wildland fire use and prescribed fire would also help to remove encroaching juniper, which would further help to trend these areas toward lower FRCC. Non-fire fuel treatments would be focused in those areas where fire is not appropriate due to the proximity of values at risk from fire and/or degraded vegetation conditions. By employing non-fire fuel treatments, the trend to lower FRCC would occur in treated areas. In summary, short-term results of the Proposed Action should help to limit further degradation of low- and high-elevation sagebrush due to fire related cheatgrass expansion, but would likely move more limited acreage of low-elevation sagebrush toward lower FRCCs.

**Grassland** In the short-term, wildfire suppression and lack of wildland fire use in FRCC 3 and FRCC 2 areas of this vegetation type with existing or potential invasive species (primarily areas below 7,000 feet in elevation) would help to limit further degradation due to cheatgrass invasion and expansion. Post-fire seeding efforts would further help to limit cheatgrass invasion and expansion and start to trend these areas toward lower FRCCs. Allowing wildfires in areas of this vegetation type with low potential for cheatgrass invasion (primarily areas above 7,000 feet in elevation) would help maintain or reduce FRCCs. Prescribed fire (primarily areas above 7,000 feet in elevation) would help to trend this vegetation type toward a lower FRCC and reduce encroachment by juniper. Non-fire fuel treatments would also help to prevent further expansion of juniper and trend this vegetation type toward a lower FRCC.

**Cheatgrass** Cheatgrass dominated areas are considered to be in FRCC 3 and the same impacts, benefits and trends noted above for FRCC 3 grasslands would apply. In addition, management efforts aimed at reducing the risk of cheatgrass should help to limit further expansion of cheatgrass. These benefits should be accretive through time as post-fire seeding helps to recover native vegetation communities and FRCCs are lowered across salt desert scrub, sagebrush, grassland, blackbrush and creosote and bursage vegetation types that are prone to cheatgrass invasion.

**Blackbrush** In the short-term, wildfire suppression and lack of wildland fire use and prescribed fire in this vegetation type would help to preserve existing blackbrush communities and limit further degradation due to cheatgrass invasion and expansion. Post-fire seeding efforts would further help to limit cheatgrass invasion and expansion. Non-fire fuel treatments would consist of small scale projects.

**Mountain Shrub** In the short-term, wildland fire, prescribed fire and non-fire fuel treatments would begin to restore a more diverse seral mosaic (age structure) within this vegetation type. Under the Proposed Action, post-wildfire seeding would help to reduce the potential for invasion by weedy species. Collectively, these impacts would help to trend this vegetation type toward a lower FRCC.

**Mixed Conifer** In the short-term, wildland and prescribed fire in FRCC 1 and FRCC 2 areas of this vegetation type would help to maintain or improve age class diversity and

decrease fuel loadings, thereby maintaining or improving FRCCs. In FRCC 3 areas, use of non-fire fuel treatments may be used to help reduce excessive fuel loadings prior to the re-introduction of fire as a management tool. This approach would help to improve these areas to FRCC 2 or FRCC 1. Where aspen is a component of mixed conifer stands, fire would promote regeneration of clonal aspen sprouts while the spruce and fir component is reduced accordingly. Tree planting following fire would maintain species composition and age class diversity.

**Ponderosa Pine** In the short-term, wildland and prescribed fire in FRCC 1 and FRCC 2 areas of this vegetation type would help to maintain age-structure diversity and decrease fuel loadings, particularly in forest understories, thereby maintaining or improving FRCCs. In FRCC 3 areas, use of non-fire fuel treatments may be used to help reduce excessive fuel loadings prior to the re-introduction of fire as a management tool. Reintroducing fire use would also reduce encroachment by juniper. Seeding and tree planting following fire would help restore and rehabilitate burned areas.

**Riparian and Wetland** In the short-term, wildland fire, prescribed fire and non-fire fuel treatments would promote seral and compositional diversity in native riparian and wetland vegetation types. These fire management tools may also be useful in reducing exotic species and would help to trend this vegetation type toward lower FRCCs.

**Creosote and Bursage** In the short-term, wildfire suppression and lack of wildland fire use and prescribed fire in this vegetation type would help to limit further degradation due to cheatgrass and red brome invasion and expansion. Under the Proposed Action, aggressive post-fire seeding would help to reduce the threat of invasive species expansion and begin to trend this vegetation type toward a lower FRCC.

**Aspen** In the short-term, the use of wildland fire, prescribed fire and mechanical treatments and fencing until aspen could survive grazing and browsing would help to maintain or improve age class diversity and reduce juniper encroachment, thereby maintaining or improving the FRCC.

#### LONG-TERM

**Salt Desert Scrub** Wildfire suppression and lack of wildland fire use would continue to inhibit further loss and degradation in this vegetation type due to invasive species expansion. Ultimately, ongoing invasive species control efforts, which may include use of prescribed fire as a pretreatment, may help to trend this vegetation type toward a more desirable, lower FRCC. Application of non-fire fuel treatments aimed at restoring native communities would improve the FRCC.

**Pinyon and Juniper Woodland** Longer term effects would be similar to short-term effects for this vegetation type, with effects and benefits (i.e., reducing cheatgrass invasion and expansion and promoting recovery of pre-settlement vegetation types and stand densities) occurring across more acres and creation of a more diverse vegetation mosaic across the landscape. Wildfire and fuel treatments within encroaching woodlands would decrease tree canopy density and reduce the competition for water and sunlight with remaining understory species. A diverse vegetation mosaic would also help to reduce the risk of large, severe fires in this vegetation type.

**Sagebrush** Wildfire suppression and lack of wildland fire use would continue to inhibit further loss and degradation in lower-elevation sagebrush vegetation types due to

cheatgrass invasion. Over time, wildfires and subsequent rehabilitation restoration efforts may lower FRCCs and create a more diverse vegetation mosaic across portions of the landscape. Use of prescribed fire and non-fire fuel treatments would help to trend this vegetation type, especially high-elevation sagebrush, toward a more desirable, lower FRCC. As areas trend toward FRCC 1 or FRCC 2 with intact native understories, fire would increasingly be allowed to play its natural role across this vegetation type, however this would most likely be limited to high-elevation sagebrush for the foreseeable future. A more diverse vegetation mosaic would also help to reduce the risk of large, severe fires in this vegetation type.

**Grasslands** Wildfire suppression and lack of wildland fire use would continue to inhibit further loss and degradation of this vegetation type in areas susceptible to cheatgrass invasion. Ultimately, ongoing post-fire rehabilitation seeding would help to trend this vegetation type toward a more desirable, lower FRCC. Application of non-fire fuel treatments would help to prevent further encroachment by juniper, further degradation of FRCC and further loss of this native vegetation type.

**Cheatgrass** Management efforts aimed at reducing the risk of cheatgrass invasion and rehabilitation already-invaded area would also help to limit further expansion of annual grasslands composed of cheatgrass. Likewise, these benefits should be accretive through time as post-fire seeding helps to recover native vegetation communities and FRCCs are lowered across salt desert scrub, sagebrush, grassland, blackbrush and creosote and bursage vegetation types that are prone to cheatgrass invasion.

**Blackbrush** Wildfire suppression and lack of wildland fire use and prescribed fire would continue to inhibit further loss and degradation of this vegetation type due to cheatgrass invasion. Ultimately, ongoing post-fire rehabilitation seeding may help to trend this vegetation type toward a more desirable, lower FRCC, although that would be dependent in part upon determination of successful approaches for regenerating blackbrush. If successful non-fire fuel treatments are identified, their application may help to help to prevent further loss of blackbrush communities or degradation of FRCC.

**Mountain Shrub** Longer term effects would be similar to short-term effects with the creation of a healthier, more diverse vegetation mosaic across more of the landscape. These efforts would promote a trend toward lower FRCCs and may help to reduce the risk of large, severe fires in this vegetation type.

**Mixed Conifer** Longer term effects would be similar to short-term effects with the creation of a healthier, more diverse vegetation mosaic across more of the landscape. These efforts would promote the mixed conifer vegetation type to trend toward a lower FRCC and promote regeneration of aspen.

**Ponderosa Pine** Longer term effects would be similar to short-term effects with the creation of a healthier, more diverse vegetation mosaic across more of the landscape.

**Riparian and Wetland** Longer term effects would be similar to short-term effects across more of the landscape. These efforts would help this vegetation type to trend toward lower FRCCs.

**Creosote and Bursage** Longer term, wildfire suppression and lack of wildland fire use and prescribed fire would continue to inhibit further loss and degradation in this vegetation type due to cheatgrass and red brome invasion. Ultimately, this would help

to trend this vegetation type toward a more desirable, lower FRCC. Application of non-fire fuel treatments would help to prevent further expansion of cheatgrass and red brome invasion and degradation of FRCC in this vegetation type.

**Aspen** Longer term effects would be similar to short-term effects, creating a more diverse mix of successional stages of aspen forests across the landscape. Pure aspen stands would become more numerous and larger. Greater representation of early and mid seral aspen stands would be more resistant to insect and disease outbreaks, thereby reducing the risk of severe wildland fires.

#### **4.2.3.1 Noxious Weeds**

##### **SHORT-TERM**

Invasive, exotic and noxious species have infested much of the West, including Utah, in response to disturbances such as high severity fire. Invasive and noxious weed populations often multiply after wildfires due to seed banks in the soil that are quickly capable of utilizing the flush of nutrients and lack of competition. Aggressive seeding, rehabilitation, monitoring, and weed treatment after wildfire events would help minimize the impact from weed invasion after a wildfire.

Impacts from wildland fire use on the spread of noxious and invasive weeds would be minimal. This is based on the agency's use of wildland fire only in areas where a low potential for noxious and invasive weed occurrence and spread exists.

Hazardous fuels reduction projects including prescribed fire and non-fire treatments would be planned to aid in the removal of noxious and invasive weeds. In some cases where weeds have been identified as an issue, seeding would follow planned fire and non-fire fuel treatments. Under the Proposed Action the spread of invasive and noxious weeds using these types of actions would be minimal.

After any surface disturbing treatment, proper rehabilitation is essential to deter the re-establishment of weeds. Implementation may include the seeding of desirable native and non-native perennial grasses and perhaps shrubs and forbs. Appropriate seed mixtures of native and non-native plants seeded at appropriate times are effective in becoming quickly established and not allowing weed seedlings to take root. Encouraging the growth and productivity of desirable vegetation typically inhibits the re-establishment of invasive weeds. The degree and type of rehabilitation management required would depend on the nature and severity of the weed control treatment and the severity of the invasion prior to the treatment.

##### **LONG-TERM**

The long-term impacts from wildland fire suppression activities on invasive and noxious weeds is related to the likelihood of less severe and/or smaller wildfires, which would lower the potential for post-fire weed increases. This, in combination with continuing seeding, rehabilitation, monitoring and weed treatment, should control the spread of these weeds following wildfire.

Impacts from wildland fire use on the spread of noxious and invasive weeds would be minimal. This is based on the agency's use of wildland fire only in areas where the potential for noxious and invasive weed occurrence and spread is low.

Hazardous fuels reduction projects including prescribed fire and non-fire treatments would be planned to aid in the removal of noxious and invasive weeds. Under the Proposed Action the long-term spread of invasive and noxious weeds using these types of actions would be minimal.

#### 4.2.4 Special Status Species

##### SHORT-TERM

**ESA-Related Species** In accordance with Section 7(a) 2 of the Endangered Species Act of 1973, as amended, the Utah BLM State Office engaged in formal consultation with the USFWS. This process involved preparing a Biological Assessment (BA) that included impact analyses and subsequent determinations for all federally listed and proposed species. The BA considered potential project-related effects (direct and indirect) to each species and their habitat from the fire management actions presented in the Proposed Action Alternative.

Effects determinations within the BA include May Affect, Not Likely to Adversely Affect (NLAA); May Affect, Likely to Adversely Affect (LAA); and Not Contribute to Federal Listing (NCL). Each determination was based on analysis of this Proposed Action, as well as proposed FMP direction across the state. For any species with designated or proposed critical habitat, the determination for effects to that habitat was combined with the determination for effects to the species. All determinations take into consideration potential short-term, long-term, and cumulative impacts from wildland fire suppression, wildland fire use, prescribed fire, and non-fire fuels treatments.

Thirty (30) species were given a determination of LAA, five species were given a determination of NLAA, and 14 species were given a determination of NCL. The 30 species that were given a determination of LAA include the following: black-footed ferret, Canada lynx, Utah prairie dog, southwestern willow flycatcher, California condor, bald eagle, Mexican spotted owl, desert tortoise (Mojave population), June sucker, humpback chub, bonytail chub, Virgin River chub, woundfin, Colorado pikeminnow, razorback sucker, Lahontan cutthroat trout, dwarf bear-poppy, Shiwitz milk-vetch, Holmgren milk-vetch, Barneby ridge-cress, Kodachrome bladderpod, San Rafael cactus, shrubby reed-mustard, Maguire daisy, Siler pincushion cactus, Winkler cactus, Clay reed-mustard, Uinta Basin hookless cactus, Ute ladies'-tresses, and last chance townsendia. Designated critical habitats have been finalized (and effects to them analyzed) for the following species: the Mexican spotted owl, desert tortoise (Mojave population), June sucker, humpback chub, bonytail chub, Virgin River chub, woundfin, Colorado pikeminnow, and razorback sucker.

The five species that were given a determination of NLAA include the following: Kanab ambersnail, Barneby reed-mustard, Wright fishhook cactus, Welsh's milkweed, and Jones cycladenia. The 14 species that were given a determination of NCL include the following candidate and petitioned species: white-tailed prairie dog, Gunnison prairie dog, pygmy rabbit, western yellow-billed cuckoo, Gunnison sage grouse, greater sage grouse, fat-whorled pondsnail, Coral Pink Sand Dunes tiger beetle, horseshoe milk-vetch, Rabbit Valley gilia, Graham's beardtongue, White River beardtongue, Goose Creek milk-vetch, Mussentuchit gilia. For detailed discussion pertaining to the effects determinations for ESA-related species, and refer to the BA found in the Administrative Record for this project.

Additional consultation with the USFWS would still be required for all implementation-level fire management activities if they would be implemented within suitable or potentially suitable habitat for federally listed species. The Alternative Consultation Agreement to Implement Section 7 Counterpart Regulations may be employed for consultation on projects that support the National Fire Plan.

**BLM-Sensitive Species** In addition to RPMs designed to protect ESA-related species and their habitat, RPMs have also been built into the Proposed Action to protect BLM-sensitive species. These RPMs include the review and inclusion of appropriate conservation and management plan direction into project proposals, as well as direction contained in the BLM 6840 Manual for Special Status Species. The RPMs would also assure that any proposed project would conserve BLM-sensitive species and their habitats, and that any action authorized, funded or carried out by the BLM would not contribute to the need for any species to become listed.

Some of the goals of the Proposed Action are to restore historical habitats and native plant species and to enhance, maintain, and protect ecological resources. Short-term adverse impacts would be offset by long-term effects of rehabilitation activities (built into the Proposed Action for soil disturbing activities), protection of ecological resources (from effective fire suppression), and reduction of fuels (following prescribed fire, non-fire fuel treatment or implementation of wildland fire use). The subsequent, gradual return to a more natural fire regime would result in long-term beneficial effects.

Despite the particular life history and habitat requirements of each special status species, some short-term effects can be generalized, based on the types of fire management activities being proposed and general ecological principles. The discussions presented below describe the general residual impacts that could occur following implementation of the Proposed Action with its RPMs. In some cases, depending on the severity or scope of an effect, or recovery rates of a particular species or habitat component, specific effects could be short- or long-term and are listed below. RPMs are designed to minimize effects, particularly from pre-planned fire management activities (such as prescribed fire and non-fire fuels reduction treatments), and prevent them from becoming long-term.

Wildfire suppression has the highest potential for negative effects to special status species, since RPMs may not be able to be implemented if firefighter or public safety is at risk or for other necessary reasons. These direct short-term impacts include:

- Visual or auditory disturbance or displacement of individuals from low-flying aircraft, vehicles, heavy equipment, and firefighters during fire management actions, affecting foraging, roosting, or reproductive behavior.
- Mortality or injury of adults, young, or eggs from smoke inhalation during burning operations or from vehicles or equipment used during fire management actions.
- Mortality of adults, young, or larvae of aquatic species from using occupied water sources for fire management actions.
- Nest/den abandonment or mortality of young or eggs, resulting in the loss of one year's recruitment.
- Injury or mortality due to inadvertent strikes during aerial drops of fire retardant.
- Illness or mortality due to inadvertent chemical contamination of terrestrial

species or aquatic habitats and species (special status species or prey species) during aerial applications of fire retardant.

- Heat stress or mortality to special status plants from firing operations.
- Crushing of special status plants, resulting in damage or mortality, from human foot traffic or use of vehicles and heavy equipment in fire management actions.
- Damage to the seedbank of federally protected plants due to mechanical disruption during fire management actions.
- Removal of key habitat components for nesting or denning, foraging, roosting, or cover due to equipment or operational tactics, including:
  - snag removal for safety reasons;
  - tree and shrub removal and soil disturbance during fireline construction;
  - vegetation removal and soil disturbance during helipad or base camp construction;
  - vegetation removal and soil disturbance during temporary road construction for access; and
  - decreased water quantity for aquatic species from water removal during low flow periods.
- Damage or loss of riparian or upland vegetation or downed woody debris and increased surface run-off from fire suppression operations or emergency rehabilitation and stabilization activities, resulting in:
  - decreased channel stability and alteration of channel morphology;
  - increased erosion and sediment and ash levels within and adjacent to the stream channel;
  - increased water temperatures;
  - degraded water quality (nutrient, temperature, and sediment levels);
  - reduced riparian and instream habitat cover and woody debris necessary for properly functioning riparian areas and aquatic habitat;
  - altered water velocities and substrate composition; and
  - decreased and altered composition and abundance of aquatic and terrestrial food sources.

Indirect short-term of suppression actions include:

- Increased risk of predation from removal of cover.
- Changes in food or prey quality and quantity or foraging habitats.
- Spread of disease or non-native, predatory species among different water sources.
- Soil erosion within the area of special status plant populations following fire suppression operations.
- Increase in invasive plant species that may out-compete special status plant species from burning operations during fire suppression tactics.



Because of specific operational prescriptions for wildland fire use and pre-planning for prescribed fire, RPMs would be incorporated into site-specific project plans for prescribed fire and the identification of areas suitable for wildland fire use would be mapped in the FMPs. This would allow BLM to minimize or avoid many negative short-term effects to federally protected species from these activities. Conversely, these types of fire use would have a greater potential for positive long-term benefits to special status species and their suitable habitat (including designated and critical habitat), than wildland fire suppression.

Direct short-term effects from wildland fire use and prescribed fire would be very similar to the effects described for wildland fire suppression. However, due to the pre-planned nature of prescribed fire and limited acres where wildland fire use would be appropriate, effects from wildland fire use and prescribed fire would be reduced compared to fire suppression.

Direct and indirect effects from non-fire fuels reduction treatments and ESR actions would be similar to those for fire suppression, wildland fire use and prescribed fire. Because of pre-planning and specific operational prescriptions for non-fire fuel treatments and ESR actions, RPMs would be incorporated into site-specific project plans and operations as necessary. This would allow BLM to avoid or minimize negative short- and long-term effects to federally protected species from these activities. Additionally, these pre-planned treatments would have a greater potential for beneficial long-term effects to special status species and their suitable habitats (including any designated or critical habitats) than wildland fire suppression. Much of the uncertainty surrounding effects related to fire is eliminated for non-fire fuel treatments. The following direct short-term effects could occur to special status species from non-fire fuel treatments and ESR actions:

- Visual or auditory disturbance from vehicles, heavy equipment, and humans during treatments.
- Displacement or crushing of small animals (special status species or their prey) and special status plants from vehicles or heavy equipment and from piling of slash during treatments.
- Removal of key habitat components for nesting or denning, foraging, roosting, dispersal, or cover from clearing vegetation, snags, or downed woody debris during treatments.
- Soil or ground disturbance from vehicles or heavy equipment during treatments, resulting in disturbance or destruction of vegetation (federally protected plant species and habitats for wildlife or fish) and subsurface dens or burrows.
- Damage to the seedbank of federally protected plants due to mechanical disruption during manual or mechanical treatments.

Indirect short-term impacts of non-fire fuels actions include:

- Increased risk of predation from removal of cover.
- Changes in food or prey quality and quantity or foraging habitats.
- Soil erosion within the area of special status plant populations following mechanical treatments in which seeding is not completed or is unsuccessful.

- Increase in invasive plant species that may out-compete federally protected plant species following manual or mechanical treatments in which seeding is not completed or unsuccessful.

#### Short-term Impact on Species Habitat

Special status species have suitable habitat and are known to occur within all 11 vegetation types in the planning area. Habitat for these species would be vulnerable to any of the impacts that are discussed in Section 4.2.3 (Vegetation). Although fire management activities would vary among vegetation communities, they could affect species and species habitat within these vegetation types. Since species occurrence records do not account for areas that have not been surveyed, unknown individuals or populations of a particular species may exist within any of these vegetation communities. Resource Protection Measures have been incorporated into the Proposed Action that would address unknown populations and consideration of suitable habitat associated with them in each vegetation type.

The goals and objectives of the proposed fire management actions are based on the types and condition of the various vegetation communities within each planning area. In turn, these vegetation communities provide the key habitat components for the various special status species. Many habitats have been altered within Utah from human-caused changes in either the structure or composition of the vegetation communities, resulting in a change in the historical Fire Regime. Some habitats that are fire-adapted have had fire excluded, while noxious weed infestations now carry wildland fires in some non-fire-adapted habitats. Heavy fuel loads or invasive non-native plant species put these vegetation communities, and thus the species that inhabit them, at greater risk from severe fires.

Changes in vegetation structure and composition can alter both the quality and quantity of various habitats for the federally protected species that occupy them. For impacts analyses to special status species, the baseline for each species is not a condition of “no wildland fires,” but rather the current condition of the vegetation communities in which the species live, and the current risk of severe wildland fire. The Vegetation section of this EA describes the FRCC, fire ecology, and current status of the vegetation communities on BLM-administered lands in Utah that, in turn, provide the basis for analysis of the Proposed Action. The list of habitat associations in Chapter 3 of this EA links the special status species that may be affected by the Proposed Action within these vegetation communities.

**Salt Desert Scrub** Species that are found within salt desert scrub habitat would have greater short-term project-related impacts because this habitat is relatively far-removed from its natural fire regime compared to species in more ecologically intact habitats. Short-term impacts from implementation of fire management activities could consist of species mortality, temporary displacement, or habitat loss.

**Pinyon and Juniper Woodland** Species that are found within pinyon and juniper woodland habitat would have greater short-term project-related impacts because this habitat is relatively far-removed from its natural fire regime compared to species in more ecologically intact habitats. In addition, species in this habitat type would be impacted because the expanse of this habitat type would decrease. Short-term

impacts from implementation of fire management activities could consist of species mortality and temporary displacement, as would consist of habitat loss.

**Sagebrush** Species that are found within sagebrush habitat would have greater short-term project-related impacts because this habitat is relatively far-removed from its natural fire regime compared to species in more ecologically intact habitats. Short-term impacts from implementation of fire management activities could consist of species mortality, temporary displacement, or habitat loss. Additionally, because high-elevation sagebrush communities would be suited for more widespread application of wildland fire use, species residing in high-elevation habitat would be expected to incur greater impacts than those residing in low-elevation habitat.

**Grassland** Species that are found within grassland habitat would have greater short-term project-related impacts because this habitat is relatively far-removed from its natural fire regime compared to species in more ecologically intact habitats. Short-term impacts from fire management activities could result in mortality of special status species, temporary displacement, or habitat loss.

**Blackbrush (including Creosote and Bursage)** Species that are found within blackbrush habitat would incur few impacts from the Proposed Action since treatments are very limited in this vegetation type. Short-term impacts could include mortality, temporary displacement or habitat destruction associated with wildfire suppression and non-fire fuels reduction treatments.

**Mountain Shrub** Species that are found within mountain shrub habitat could incur short-term project-related impacts during fire management actions designed to maintain or lower the current FRCC. Short-term impacts to mountain shrub species could include mortality, temporary displacement, and habitat loss.

**Mixed Conifer** Species that are found within mixed conifer habitat could incur short-term project-related impacts during fire management actions designed to maintain or lower the current FRCC. Short-term impacts associated with these fire management actions could include species mortality, temporary displacement, or habitat loss.

**Ponderosa Pine** Species that are found within ponderosa pine habitat could incur short-term project-related impacts during fire management actions designed to maintain or lower the current FRCC. Short-term residual impacts could include species mortality, temporary displacement, or habitat loss.

**Riparian and Wetland** Species that are found within riparian and wetland habitat could incur short-term project-related impacts during fire management actions. These could include species mortality, temporary displacement, and habitat loss.

**Aspen** Species that are found within aspen habitat could incur short-term project-related impacts during fire management actions. Short-term impacts from these fire management activities could result in mortality of special status species, temporary displacement, or habitat loss.

**Water** Direct effects to water and aquatic inhabitants could occur from wildfire suppression and wildland fire use, including the introduction of fire retardant, aviation fuel or lubricants into streams and wetlands; erosion of exposed soils from fireline construction on steep slopes adjacent to streams; damaged riparian vegetation and soils (resulting in erosion) from the use of heavy equipment and establishment of fire

camps; and reduced natural stream flow during drafting and pumping. These impacts would adversely impact water quality of various fisheries throughout the state. The collective short-term impacts of increased sedimentation (from erosion) could have watershed-wide effects including changes in temperature, turbidity and water chemistry. However, Resource Protection Measures that were developed for riparian and wetland habitat and BLM-sensitive species would minimize the potential for short-term adverse impacts to aquatic species and their habitat.

Additionally, because Resource Protection Measures would ensure limited acres of prescribed fire and constraints on non-fire fuels reduction treatments in and adjacent to riparian and wetland and water habitats, short-term adverse impacts from these fire management activities would be minimized or eliminated.

#### LONG-TERM (For ESA and BLM-Sensitive Species)

With suppression being implemented only when necessary, and wildland fire use, prescribed fire, and non-fire fuels reduction treatments being used to minimize fuel loading, vegetation communities and wildlife habitats would transition over time to more closely reflect conditions associated with a habitat's natural fire regime. This would create a more balanced (diverse) and stable ecosystem that would have a reduced threat of severe wildfire. This long-term effect would provide for more species diversity in a more fire-tolerant ecosystem. Because wildland fire use and prescribed fire would not likely consist of large fires, and rehabilitation would be implemented as necessary and appropriate, mortality or long-term displacement of species would likely be avoided. If management activities were implemented repeatedly within the same treatment area, (e.g., mechanical treatment followed by prescribed fire followed by biological treatment) populations could be displaced over the long-term. However, to the extent that suitable habitat were available nearby, these impacts would be offset by the reinstatement of natural conditions.

Wildfire suppression has the highest potential for negative effects to special status species, since RPMs may not be able to be implemented if firefighter or public safety is at risk or for other necessary reasons. Thus, the following long-term residual effects could occur to special status species from wildland fire suppression:

- Federally protected species and their designated critical habitat could benefit from interdependent effects of wildland fire suppression actions that prevent loss of designated critical habitat or suitable habitat from severe wildland fires.
- Federally protected species and their designated critical habitat could experience positive interrelated effects from post-fire ESR efforts in or near occupied sites, which would avoid or minimize further negative indirect effects to populations or key habitat components from either the wildland fire or fire suppression operations.
- Long-term impacts to the federally protected species or their designated critical habitat could occur from:
  - inadvertent high mortality of a species; or
  - long-term changes (alteration, removal, damage, or fragmentation) to suitable habitat components.

By implementing RPMs, negative long-term effects to habitat quality or quantity would typically be avoided or limited in scope and/or intensity. For many species, long-term negative effects would be greater from the wildland fire itself, rather than from the fire suppression operations. For situations where extensive or aggressive fire suppression would be necessary, or when species or habitat components have a long recovery rate, the following long-term negative effects could occur:

- When a species has relatively few individuals, is extremely localized or specialized in its habitat, or has a slow reproductive rate, short-term effects may become long-term effects. Any direct mortality of individuals, loss of endemic populations, or alteration of potentially suitable habitat could cause long-term negative effects. Because wildland fire suppression operations are typically localized, even under extreme conditions, this activity would generally not affect wide-ranging species in the long-term, unless they have a low reproductive rate.
- Long-term changes in quality or quantity of habitat when key habitat components are slow to recover, affect the ability of a federally protected species to continue occupying a site. These changes include:
  - damage, removal, or fragmentation of nesting, roosting, foraging, dispersal, or cover habitats for terrestrial wildlife, particularly for woodland, forest, or some components of sagebrush habitats;
  - long-term alterations to water quality or quantity; removal of riparian or upland vegetation, or downed woody debris; increased surface runoff; or introductions of disease or non-native, predatory species, for fish and aquatic species; and
  - extensive or severe damage to seedbanks, substrates, vegetative composition, or structure of habitats for plant species.
- Long-term changes in prey populations when key habitat components are slow to recover.
- Increase in invasive plant species that may out-compete federally protected plant species or alter sensitive (or non-fire adapted) habitats of terrestrial wildlife species following fire. RPMs or ESR actions would typically mitigate this potential effect to prevent it from becoming a long-term impact.

Pre-planning, including pre-project surveys and consultation with the USFWS, as well as implementation of RPMs, would typically prevent mortality of individual species during prescribed fire, non-fire fuels treatment and ESR actions. Additionally, identification of areas as *not* suitable for wildland fire use (areas that contain important or critical wildlife and terrestrial habitats) would prevent mortality of individual species. Thus, negative long-term effects from wildland fire use, prescribed fire, non-fire fuel treatments, and ESR actions to species or suitable habitat would generally be avoided or limited in scope and/or intensity. However, if key habitat components were targeted for permanent change in structure or composition, long-term effects could be negative or beneficial for a species, depending on its particular habitat needs. The following long-term effects could occur from wildland fire use, prescribed fire, non-fire fuel treatment and ESR actions:

- When a species has relatively few individuals, is extremely localized or specialized in its habitat, or has a slow reproductive rate, short-term effects may

become long-term effects. Any inadvertent mortality of individuals, loss of endemic populations, or alteration of potentially suitable habitat could cause long-term negative effects. Because actions are typically localized compared to overall habitat availability, these activities would generally not affect wide-ranging species in the long-term.

- Long-term changes in quality or quantity of habitat when key habitat components are slow to recover, affect the ability of a special status species to continue occupying a site. These changes include:
  - damage, removal, or fragmentation of nesting, roosting, foraging, dispersal, or cover habitats for terrestrial wildlife, particularly for woodland, forest, or some components of sagebrush habitats;
  - long-term alterations to water quality or quantity; removal of riparian or upland vegetation, or downed woody debris; increased surface runoff; or introductions of disease or non-native, predatory species, for fish and aquatic species; and
  - extensive or severe damage to seedbanks, substrates, vegetative composition, or structure of habitats for plant species.
- Long-term changes in prey populations when key habitat components are slow to recover.
- Increase in invasive plant species that may out-compete special status plant species or alter sensitive (or non-fire adapted) habitats of terrestrial wildlife species following actions. RPMs would typically mitigate this potential effect to prevent it from becoming a long-term impact.
- Long-term beneficial effects to species from:
  - decreased risk for large, severe fire events through fuels reduction and the gradual transition to a more natural Fire Regime; or
  - restoration of habitats that have been altered due to invasion of non-native species, or long-term exclusion of fire (in fire-adapted vegetation communities).
  - increased species' reproduction rates, population numbers, or distribution, potentially facilitating the return of a species to its historic range.

#### Long-term Impact on Species Habitat

**Salt Desert Scrub** Long-term impacts would include a beneficial stabilization of the ecosystem, with a decreased risk of severe fire.

**Pinyon and Juniper Woodland** Short-term impacts including the loss of potentially suitable habitat for special status species would likely be offset by the long-term presence of suitable, unoccupied pinyon and juniper woodland habitat nearby, and the transition to a more stable ecosystem with less risk of severe wildfire. Accordingly, net long-term impacts would be beneficial.

**Sagebrush** Long-term impacts would include expanded acreage of healthier high-elevation sagebrush habitat and an overall transition to a lower FRCC within both low- and high-elevation sagebrush habitats that would benefit species.

**Grassland** The establishment of a lower FRCC would produce a long-term beneficial effect of a lower risk of severe wildfire. Additionally, because this habitat would eventually be expanded by removal of pinyon and juniper encroachment, special status species that utilize grassland habitat would benefit.

**Blackbrush (including Creosote and Bursage)** Long-term impacts would be beneficial and would include either maintaining or lowering the existing FRCC and, subsequently, reducing the likelihood of a severe wildfire.

**Mountain Shrub** Long-term impacts to mountain shrub habitat and its associated species would be beneficial. Fire management actions would begin to restore a more diverse mountain shrub ecosystem, trending it toward a lower FRCC with lower risk for severe wildfire.

**Mixed Conifer** The long-term effects of the proposed project would eventually produce a more stable ecosystem with a lower FRCC, lower risk of severe wildfire and greater species diversity. These impacts would be beneficial to mixed conifer habitat and the species associated with it.

**Ponderosa Pine** Long-term effects would eventually produce a more stable ecosystem with a lower FRCC, lower risk of severe wildfire and maintenance of habitat size (e.g. limiting pinyon and juniper encroachment), would result. These impacts would be beneficial to ponderosa pine habitat and the species associated with it.

**Riparian and Wetland** The long-term impacts would include a reduced risk for severe wildfire and a more diverse ecosystem.

**Aspen** Long-term, fire management actions would serve to lower the existing FRCC and, subsequently reduce the risk of a severe wildfire. Additionally, fire management actions within mixed conifer habitat could increase the aspen component. Collectively, fire management actions within mixed conifer and aspen habitats could increase overall aspen habitat throughout the planning area. These impacts would be beneficial to special status species and their aspen habitat.

**Water** Long-term impacts to water and its aquatic inhabitants would be a reduced risk for severe wildfire in upstream and adjacent habitats. Consequently, the ecosystem would be less likely to incur such large-scale impacts from fire as to decimate an entire fish population.

#### **4.2.5 Fish and Wildlife**

Fire management activities have the potential to directly and indirectly affect fisheries and wildlife throughout the planning area, depending upon treatment timing, extent, location, elevation, duration, fuel, severity of fires, as well as habitat type or vegetation community and soil type of treated area. Impacts on vegetation communities and habitats are discussed separately in Section 4.2.3 and 4.2.4, respectively. Any effects to vegetation have the potential to directly or indirectly affect the fish and wildlife species that inhabit them or areas adjacent to (or downstream from) them.

Some of the goals of the Proposed Action are to restore historical habitats and native plant species and to enhance, maintain and protect ecological resources. These would likely be accomplished through the implementation of rehabilitation (post-wildfire and treatment) activities, where practical and applicable, thereby improving habitat

condition for these species. Resource Protection Measures (Section 2.2.6) were built into the Proposed Action in order to minimize or eliminate adverse effects to species and habitat.

Direct impacts would be short-term and less adverse over time. In the long-term, overall hazardous fuels reduction would gradually reduce the risk of a severe fire event and restore an ecosystem that reflects a more natural fire regime.

#### SHORT-TERM

**Fish** Resource Protection Measures included in the Proposed Action would limit the potential for impacts to fisheries and aquatic resources. However, direct effects could occur from wildfire suppression and wildland fire use, including the introduction of fire retardant, aviation fuel or lubricants into streams and wetlands; erosion of exposed soils from fireline construction on steep slopes adjacent to streams; damaged riparian vegetation and soils (resulting in erosion) from the use of heavy equipment and establishment of fire camps; and reduced natural stream flow during drafting and pumping. These impacts would adversely impact water quality of various fisheries throughout the state. The collective short-term impacts of increased sedimentation (from erosion) could have watershed-wide effects including changes in temperature, turbidity and water chemistry.

Because Resource Protection Measures would ensure limited acres and severity of prescribed fire and constraints on non-fire fuels reduction treatments in and adjacent to riparian and wetland, and water habitats, short-term adverse impacts from these fire management activities would be minimized or eliminated.

**Non-Game and Big Game Species** Short-term adverse impacts (e.g., direct species mortality, habitat destruction and habitat displacement) to non-game and big game species would be minimized by Resource Protection Measures. However, fire management activities could still result in short-term adverse impacts. These impacts would likely affect suitable habitat utilized by raptors, migratory birds, small mammals, carnivores and predators and amphibians and reptiles, as well as a variety of habitats associated with big game species.

Direct effects from wildfire suppression could include the introduction of fire retardant, aviation fuel or lubricants into any occupied or potentially suitable habitat; erosion of exposed soils from fireline construction on steep slopes; and damaged vegetation and soils from the use of heavy equipment and establishment of fire camps. Direct effects from wildland fire use, prescribed fire, non-fire fuel treatments, and ESR actions could include individual mortality to plant or animal species, habitat destruction, and/or species displacement.

The four largest habitats within the planning area (salt desert scrub, pinyon and juniper woodland, sagebrush and grassland within the planning area) would be heavily targeted for fire management activities since their current conditions are more far-removed from natural conditions. However, due to the abundance of these vegetation types, nearby suitable habitat would likely be available. The species that occur within these habitat types would be more likely to incur short-term impacts from fire management activities such as mortality, habitat destruction and temporary displacement. Species that are found only in mountain shrub, mixed conifer, riparian



and wetland and aspen habitats would be less likely to incur short-term adverse impacts.

Impacts specific to the following non-game and big game species subdivisions include:

Raptors and Migratory Birds Raptors that are found in mountainous and forested habitats (e.g., mountain shrub, mixed conifer, ponderosa pine and aspen) and migratory birds that generally breed at higher elevations would likely incur few short-term impacts because these habitats more closely reflect a natural fire regime and, therefore, would likely be a lower priority for fire management activities. Raptors and migratory birds that are found within desert and riparian and wetland habitats would be more likely to incur project-related impacts because these habitats are relatively far-removed from their natural fire regimes. However, because Resource Protection Measures would be considered and implemented, as appropriate, for wildland fire use and planned actions, direct impacts would be limited to those associated with wildfire suppression activities and would include impacts such as mortality, habitat destruction and temporary displacement. Indirect impacts could include a short-term reduction in available prey sources.

Small Mammals Small mammals are found in every habitat throughout the planning area. Because habitats would be prioritized differently for fire management activities (based on their relative likeness to the natural fire regime for that habitat), small mammal populations would be affected differently throughout the planning area. Vegetation communities for which Resource Protection Measures have been developed (e.g., sagebrush and riparian and wetland), would likely maintain viable populations of small mammals during the short-term. Vegetation communities for which Resource Protection Measures have not been explicitly developed, could see a decrease in populations in the short-term (i.e., for the duration of a fire event or non-fire fuels reduction treatment).

Carnivores and Predators Many of Utah's carnivores and predators are solitary and secretive in nature and require large home ranges in order to secure adequate prey sources. Accordingly, they are generally found in mountainous and forested habitats (e.g., mountain shrub, mixed conifer, ponderosa pine and aspen). Because of their ability to travel long distances for food, shelter and safety and the fact that mountainous and forested habitats would likely be a lower priority for fire management activities (because they more closely reflect a natural fire regime), carnivores and predators would likely incur few short-term adverse impacts.

Amphibians and Reptiles Because amphibians and reptiles are found in desert and riparian and wetland habitats, which are relatively far-removed from their natural fire regime and would likely be prioritized for fire management activities, these species groups could incur short-term adverse impacts including mortality, habitat destruction and temporary displacement. However, because Resource Protection Measures would be considered and implemented, as appropriate, for wildland fire use and planned actions, direct impacts would be limited to those associated with wildfire suppression activities.

## LONG-TERM

**Fish** Long-term adverse impacts to fisheries would be minimized or avoided by implementation of Resource Protection Measures. Long-term beneficial impacts to fisheries would include a reduction in adverse impacts from a potentially severe wildfire and associated suppression activities.

**Non-Game and Big Game Species** The long-term effects of the Proposed Action on fish and wildlife species would be similar to the long-term effects described for special status animal species (Section 4.2.4). Long-term effects are summarized below for the following non-game and big game species: raptors and migratory birds; small mammals; carnivores and predators; and amphibians and reptiles.

With suppression being implemented only when necessary and wildland fire use, prescribed fire and non-fire fuels reduction treatments being used to minimize fuel loading, the vegetation communities and wildlife habitats would transition over time, to more closely reflect conditions associated with the natural fire regime. This would create a more stable ecosystem in which the threat of an unnaturally severe wildfire would be minimized.

Because wildland fire use and prescribed fire would be relatively small compared to the amount of habitat and rehabilitation that would be implemented as necessary and appropriate, mortality or long-term displacement of species would likely be avoided. Longer term displacements are possible if fire management activities were implemented repeatedly within the same treatment area (e.g., mechanical treatment followed by prescribed fire followed by biological treatment). However, to the extent that suitable habitat were available nearby, these impacts would be offset by the reinstatement of a natural fire regime.

The establishment of noxious weed populations would be minimized or eliminated by Resource Protection Measures and stipulations in the Proposed Action. Regardless of species or associated habitat, long-term impacts for non-game and big game species would be beneficial.

### 4.2.6 Cultural Resources

The direct effects of fire suppression efforts, wildland fire use, prescribed fire, seeding, non-fire fuel treatments and ESR actions could affect cultural resources. Cultural resources include archaeological, historic and architectural sites that are important for scientific research or preservation and interpretation and traditional cultural properties and religious sites that are important to Native American and other cultural groups. Resource Protection Measures incorporated into the Proposed Action, such as pre-treatment surveys and subsequent avoidance as well as the Utah State Protocol Agreement 3-7-01, should minimize these effects; however, not all cultural resources are easily detectable or avoidable. Therefore, the potential for impact does exist for cultural resources throughout the state including those in recognized congressional and administrative designated areas of importance (including ACECs with cultural or archaeological values).

Direct and indirect effects to cultural resources will be described in terms of short- and long-term threats from fire suppression efforts, wildland fire use, prescribed fire and mechanical reduction treatments.

## GENERAL DESCRIPTION OF FIRE'S EFFECTS ON CULTURAL RESOURCES

A general understanding of how fire affects cultural resources is necessary to provide context for analysis of this alternative's fire and fuels management proposals. To put the effects from the potential variations in heat generated by fire into context with different cultural resource types a discussion is presented here.

Fire effects are context dependent varying by temperature and duration of exposure to heat. Generally, higher temperatures and/or longer duration of exposure to heat increase the potential for damage to cultural resources. Variables that affect temperature and duration include type of fuel, fuel load and distribution, fuel moisture and soil type and moisture (Wiltz and Hanes 2001). As a general rule, fire does not affect buried cultural materials. Studies show that even a few centimeters of soil cover (10 cm) are sufficient to protect cultural materials (Oster n.d.). However, there are times when conditions do carry heat below the surface, with the potential to affect buried materials. These conditions include: stumps that smolder and burn have the potential of affecting buried materials that are in the vicinity, heavy duff, surface logs and roots that smolder and burn. Fires that burn hot and fast through a site may have less of an effect on certain types of cultural materials than fires that smolder in the duff or burn for a long period of time.

Prehistoric and historic resources potentially affected by fire may be inorganic (lithic, ceramics, cans, glass, rock art, etc.) or organic (basketry, wooden structures, dendroglyphs, etc.). Generally speaking organic materials are more at risk as they tend to burn or alter at lower temperatures than inorganic items.

Fire can affect chipped and groundstone tools through changes in morphology rather than in chemistry. Exposure to heat and rapid cooling may cause fracturing, potlidding, crazing, shattering, changes in color and internal luster, which might reduce an artifact's ability to render information about the past. Numerous studies provide data concerning the effects of temperature on obsidian, various silicates including chert, basalt and sandstone used for groundstone (Deal n.d., Buenger 2003, Loyd et al. 2002, Shackley and Dillon 2002, Waechter n.d.). As a general rule, hotter temperatures and longer exposure to fire may affect lithic materials. When these materials are likely to be present, it may be necessary to take protective measures.

Different types of clays, inclusions and manufacturing techniques lead to different effects among distinct ceramic types. Heat damage is not as important a consideration for ceramic artifact types as it is for others. Generally, structural damage does not occur until temperatures exceed the original firing temperature. The main type of damage noted is to the surface decoration or glaze (Andrews 2004, Rude n.d.). Pyne (1996) generally suggests that when fires remain below 500 degrees C and occur within a half an hour (as is typical for prescribed burns), little damage to artifacts and resources even at shallow depths is likely to occur.

Inorganic historic artifacts are generally safe from fire, but some artifacts such as soldered cans may melt at temperatures as low as 137-177 degrees C (Haecker n.d.). Can morphology may be damaged and ceramic artifacts may crackle or spall in lower temperature fires. Other materials, such as machinery utilized in historic mining, are less susceptible. Inorganic structures constructed of sandstone, adobe, cement-mortared fieldstone, firebrick, cinder block or cement aggregate are generally fire resistant.

Fracturing and spalling may occur at 700 degrees C (Buenger 2003). Any wooden sub-structure (common in adobe structures) may be destroyed, possibly compromising the structure as a whole. Historic earthworks such as trails, roads, irrigation ditches, canals, etc. are less sensitive to fire.

Fire has the potential to damage rock art. Though there are no specific temperature guidelines for rock art, fire effects include soot smudging and discoloration from smoke, which obscure the rock art images; degradation of the rock surface from spalling, exfoliation and increased weathering; changes in organic paints due to heat; and damage to rock varnish which may destroy its potential to date the art (Tratebas 2004, Kelly and McCarthy 2001).

Organic artifacts (e.g., basketry, digging sticks, clothing, textiles) and features (e.g., structures, bow-stave trees, wikiups, culturally modified trees, historic timber structures) made of or containing organics such as wood, leather and hide or cordage are very susceptible to burning. Bone and shell can sustain some degree of burning without complete destruction (Buenger 2003). Plant and animal residues may survive exposure to fire. Pollen may be destroyed at temperatures greater than 300 degrees C, but animal proteins survive to 800 degrees C.

Determining temporal context is an important part of archaeology. Fire has the potential to adversely impact the dating potential of archaeological data. Fire is likely to destroy organic material such as bone, wood or charcoal that yield radiocarbon dates. Fire can modify or destroy obsidian hydration rinds compromising obsidian hydration dates (Deal n.d., Buenger 2003, Loyd et al. 2002, Shackley and Dillon 2002, Solomon 2002). Finally, temperatures that exceed original firing temperatures (generally 400 degrees C) will destroy the potential for thermoluminescence dating of ceramics (Rude n.d.).

#### SHORT-TERM

Often, cultural resources are more at risk from impact due to fire suppression activities than from the wildland fire itself. Suppression efforts may be ground disturbing, such as fireline construction (hand and bulldozer lines), the establishment of helicopter bases, safety zones, fire camps, etc. and have the potential to destroy artifacts and the integrity of cultural resource sites. Water, foam detergents and fire retardants could damage artifacts and features by causing swelling and then contraction. Other potential impacts from the use of retardants would include rapid cooling and subsequent damage (e.g., breakage, spalling, corrosion, staining, rusting) to archaeological materials. Discoloration or warping of metallic surfaces could also occur. Rock art is particularly sensitive to retardants and should always be avoided. For all wildland fires or prescribed fires, post fire vandalism and artifact collection could occur. With an increase in burned acreage in the short-term this may increase.

In contrast to the current widespread management direction of full suppression of wildfires, the Proposed Action would potentially decrease the level of suppression being used on a wildfire following an appropriate management response. A decrease in the potential to impact cultural resources from ground disturbing and other suppression activities would be realized. The decrease in suppression efforts may lead to an increase in fire size in the short-term and would increase the exposure of resources to heat and associated impacts. A cultural resource specialist would be consulted during

suppression activities in areas containing sensitive cultural resources, which should help to minimize impacts.

Following suppression, ESR actions as well as other planned actions with the potential to affect cultural resources, are subject to the requirements of Section 106 of the National Historic Preservation Act, as amended (36 CFR 800, consultation with the Utah State Historic Preservation Officer). The areas that would be subjected to surface disturbance are subject to Class III cultural resource inventory. Inventories would dramatically lower the potential for impacts to cultural resources. Many areas used traditionally for hunting would be expected to be revegetated following a wildfire event. For localities where food, medicinal or raw material plants are gathered, the threat of invasive species occupying those areas may be an issue of concern.

The relatively small acreages available for wildland fire use, relative to other possible fire management actions, would minimize the potential for impacts. Wildland fire use and prescribed fire typically burn at a lower temperature and duration, thus the potential impacts from these methods would typically be less severe than those from an unmanaged wildfire event. Prescribed fire events frequently are preceded by non-fire fuel treatment actions to obtain a smaller, more manageable and less severe prescribed fire. Wildfire also was prescriptively used by many Native American tribes prehistorically to manage lands for horticulture, improve game habitat, manage subsistence and medicinal plant species, and for warfare and signaling (Blackburn and Anderson 1993, Pyne 1982).

Non-fire fuel treatments can directly impact cultural resources, depending upon their location and type. For example, ground disturbing treatments like brush crunching is more likely to impact cultural resources than a chemical treatment. The potential for proposed prescribed fire, non-fire fuel treatments, and ESR actions to affect cultural resources is considered during all phases of planning and implementation on a project-by-project basis. The most commonly selected method for the management of cultural resources located in the area of potential effect is the complete avoidance of the cultural resource.

#### LONG-TERM

The trend toward a decrease in fuel loads would decrease the number of large severe fires. This would decrease the level of suppression required on an average wildfire. A decrease in the impact to cultural resources from ground disturbing and other suppression activities would be realized in the long-term. Heat and duration-related impacts would be similarly lessened over time.

Following suppression, restoration and rehabilitation efforts with the potential to affect cultural resources, are subject to the requirements of Section 106 of the National Historic Preservation Act, as amended (36 CFR 800, consultation with the Utah State Historic Preservation Officer). The areas that would be subjected to surface disturbance are subject to Class III cultural resource inventory. This would dramatically reduce the potential for impacts from ground disturbing activities.

The relatively small acreages available to wildland fire use relative to other proposed treatments would make the potential for impact on a landscape scale much less. However, as more vegetation trends toward a lower FRCC, opportunities may exist to

expand wildland fire use. Ground disturbing actions, including seeding are not associated with wildland fire use, removing the potential for associated impacts.

Wildland fire use and prescribed fire typically burn at a lower temperature and duration, thus the potential impacts from these methods would typically be less severe than those from an unmanaged wildfire event. This advantage would continue to be utilized as more vegetation is brought to a FRCC which supports the use of these actions. Wildland fire use and prescribed fire in the long-term may result in beneficial effects for places of traditional cultural importance by bringing the native vegetation back to a more historically natural condition. However, Native American places of traditional cultural importance may be compromised if culturally important native plant species were replaced by non-native plant species which may be used for reseeding.

Prescribed fire events frequently are preceded by non-fire fuel reduction actions to obtain a smaller, more manageable and less severe prescribed fire. Non-fire fuels reduction treatments can directly impact cultural resources, depending upon their location and type. The potential for proposed prescribed fire and non-fire fuel treatments to affect cultural resources is considered during all phases of planning and implementation on a project-by-project basis. The effects of these actions on cultural resources are not expected to differ from the short-term to the long-term unless non-fire fuel treatments can be phased out as a prescribed fire pretreatment due to the trend toward an FRCC that would not support undesirable fires.

#### **4.2.7 Visual Resources**

Under the Proposed Action, vegetation treatment strategies that are consistent with managing scenic quality on public land would be implemented. These treatments would reduce the risk of severe wildfire that could potentially affect all visual classes and result in impacts on visual scenic quality. Large, severe wildland fires change the landscape in a way that could degrade visual quality, especially on fragile soils where the duration of erosion impacts may be longest.

Allowing fire to resume a more natural, ecological role across the landscape may constitute a short-term conflict between ecological sustainability and scenic aesthetics. Recent studies, however, have shown public support for controlled burns and other fuels reduction methods to reduce risk of larger, uncontrolled burns (USDA 2003). Resource values and short-term visual impacts versus long-term improvement in visual character of the landscape would be considered in planning fire management activities.

#### **SHORT-TERM**

Wildland fires generally have apparent visual impacts, such as blackened and charred areas. However, these impacts are a natural part of the environment. The severity of wildfire can have an impact on an area by making it more susceptible to visible indirect impacts such as erosion or soil sterilization. Efforts in the Proposed Action to lower the severity of fire are not expected to result in a substantial difference in short-term impacts between the Proposed and No Action scenarios. However, using an appropriate management response more land may be burned under the Proposed Action. Visual impacts of suppression efforts may include scarring from access roads and firelines. However, the Resource Protection Measure on masking overland travel

and firelines to minimize potential OHV use would also lessen the impact to visual resources.

Wildland fire use and prescribed burning could also have short-term impacts similar to wildland fire (e.g., charred areas, erosion). Non-fire fuel treatments and ESR actions could be implemented to reduce hazardous fuels with improvement in the character or scenic quality of the treatment area. Other non-fire fuel treatments may have a more negative impact on visual resources, such as leaving a pitted landscape with dispersed uprooted trees.

VRM Classes I and II (less than 20 percent of the total planning area) are the most sensitive to visual impacts (BLM 2004y). Fuel treatment techniques may be limited in some VRM Class I and II areas due to Resource Protection Measures based on scenic quality objectives and wilderness objectives. In these areas the most effective methods of suppression that are least damaging to wilderness values and the environment would be used. If vegetation conditions allow, wildland fire use would be ideal in eliminating impacts from man-made ground disturbing activities, while lessening the risk of large, more severe wildfire in the longer term.

VRM Classes III and IV (approximately 80 percent of the planning area) allow more flexibility in implementing more aggressive fuel treatments. Indirectly, these treatments could protect the more sensitive VRM Class I and II areas. Unplanned ignitions would be less likely to occur and spread in VRM Class III and IV areas due to fuels reduction, thereby reducing the overall short-term and longer-term threat to VRM Class I and II areas across the landscape.

#### LONG-TERM

Long-term effects to visual resources from wildland fire suppression, wildland fire use, prescribed fire, non-fire fuel treatments, and ESR actions are anticipated to trend landscapes away from impacts from aggressive suppression and to minimize indirect impacts to visual resources. The indirect impacts that would be lessened over time due to smaller and less severe wildfire events include post-fire severe erosion and creation of sterilized non-vegetation supporting soil. The planned action of prescribed fire, non-fire fuel treatments and ESR actions would take into account the impact of those implementation level actions on visual resources. The Proposed Action is anticipated to trend toward restoring a more natural visual landscape where fire and its visual impacts plays a natural role.

#### **4.2.8 Naturalness, Solitude, and Primitive Recreation**

Management decisions associated with the goals and values of non-WSA lands with wilderness characteristics and non-WSA lands likely to have wilderness characteristics are affected by a variety of influences outside the scope of proposed fire management actions that in turn, results in a complex strategy. Environmental actions, including changes to vegetation conditions and the resulting modification of fire's role and regime, have resulted in an existing environment much different than the historical condition. Likewise, a variety of political and regulatory management constraints associated with other resource needs and safety considerations affect how the role of fire or non-fire fuels management can be applied within these areas.

Non-WSA lands with wilderness characteristics and non-WSA lands likely to have wilderness characteristics share common values associated with naturalness, outstanding opportunities for solitude, outstanding opportunities for primitive and unconfined recreation, as well as a variety of supplemental values (ecological, geological or other features of scientific, educational, scenic or historical value). As these lands share similar values and structural components, the degree and intensity of the Proposed Action's impacts on these two separate management classifications would be similar under both for the short-term and long-term context.

#### SHORT-TERM

The goal of the Proposed Action would be to recognize fire as a natural component of the ecosystem and to allow it to play its natural role that mimics the historical fire return interval and severity. Recognizing that vegetation conditions and fuel loading within these lands are not in a historically natural condition, fire would still be considered a natural but managed component within these areas. Management of fire in its natural role within these areas would be implemented through a variety of control strategies associated with naturally ignited wildland fires as well as planned prescribed fires. Planned projects would each undergo a site-specific environmental evaluation to determine potential impacts to the resource prior to being approved.

The application of the appropriate management response to naturally-ignited wildland fires to accomplish specific resource management objectives may be identified in predefined designated portions of these areas. Full suppression of wildland fires in these areas may be implemented to control fire size and severity. Likewise, managing naturally-ignited fires may occur as appropriate for letting fire play its more natural role. Though minimized by following the Resource Protection Measures associated with the Proposed Action, short-term impacts to naturalness resulting from management response to wildland fire efforts may still include ground disturbances associated with suppression efforts. ESR actions may be prioritized within these areas to stabilize wildfire areas, minimize the threat of invasive and noxious weed species becoming established, and to preserve the natural and unique values inherent to them. These efforts would be developed as to not impair wilderness values associated with these lands.

The use of prescribed fire and non-fire treatments as a method to manage hazardous fuels and undesired vegetation cover may be implemented as well but would be designed as not to impair wilderness values. Short-term impacts on naturalness would be similar to fire suppression and ESR actions.

Opportunities for solitude and primitive and unconfined recreation may be restricted (e.g., access) or impaired (e.g., visibility) during all of these naturally-ignited and planned fire events. However, these impacts on the quality of visitor experience would be limited to the fire area and duration and likely would not affect overall use and wilderness characteristics outside of the fire area.

#### LONG-TERM

The Proposed Action would result in modification of the current condition to a condition that would be more representative of the natural vegetation cover. Long-term effects associated with the application of appropriate management responses fires and planned actions (movement toward natural fire regime and reduced severity of fire



events) would outweigh any short-term adverse impacts associated with limited naturalness impacts, access and quality of experience impacts associated with opportunities for solitude and primitive and unconfined recreation. By implementing the proposed fire management goals of reducing hazardous fuels to restore natural ecosystems and allowing fire to function in its natural ecological role, natural conditions and the array of supplemental values contained within these management areas would be enhanced and preserved. Likewise, visitor experience and opportunities for solitude and primitive and unconfined recreation may be enhanced by the restoration of the historical natural condition.

#### **4.2.9 Forestry**

The majority of forests and woodlands (collectively referred to as “forests” for this discussion) in the planning area consist of pinyon and juniper woodland that currently have minimal economic value, as discussed in Chapter 3. The following discussion presents impacts to the resource for each of the management actions in the Proposed Action.

##### **SHORT-TERM**

A change in fire management direction from full suppression (No Action) to the Proposed Action’s appropriate management response may result in more acres of forests being burned during wildfire events. This would decrease the amount of biomass, timber, firewood, fence posts, and pinyon nut harvesting opportunities in the areas affected by these events. In the short-term, the change in suppression efforts is not expected to greatly reduce the acreage of pinyon and juniper woodland that has encroached outside of its historical range. Forested areas including mixed conifer, aspen and ponderosa pine are expected to experience similar impacts in the No Action and Proposed Action with the exception of areas with FRCC 2 and 1 where suppression efforts would potentially be less aggressive.

Wildland fire use, with its limited applicability, has the potential to reduce biomass and firewood collecting opportunities in areas that are burned. Given the smaller acreages identified for potential wildland fire use, the overall impact is expected to be minimal in the short-term.

The use of prescribed fire in forests may be accompanied by non-fire treatment methods to bring the forests to a lower FRCC level and associated burn intensity. In the short-term, this would increase the opportunity for the harvesting of biomass and firewood. The use of non-fire treatment methods to reduce the occurrence of younger age classes in areas of old growth (in particular for ponderosa, aspen and mixed conifer) could increase the survivability of old growth forests during fire events (Howard 2003). This could increase the availability of higher economic value forest products, particularly in mixed conifer and ponderosa stands. The use of seeding and the planting of seedlings would increase the occurrence of desirable forest types.

##### **LONG-TERM**

Long-term impacts from the Proposed Action’s wildfire suppression efforts would reduce the acreage of pinyon and juniper encroaching on land outside of its historic range. This would directly decrease the availability of biomass and firewood collection in this vegetation type. This impact would be less pronounced in other forested areas.

However, a decrease in tree density in mixed conifer stands should improve the health of these forests. Where aspen are a component of mixed conifer stands, fire would promote regeneration of clonal aspen sprouts while the spruce and fir component is reduced accordingly.

The long-term impact of wildland fire use is expected to reduce biomass and firewood collecting opportunities in pinyon and juniper woodland. The use of wildland fire in forests would create a mosaic pattern and greater diversity of tree species, age classes and other vegetation types by breaking up expanses of homogeneous stands (Kovacic 1990). Impacts to mixed conifer, aspen and ponderosa forests would be less pronounced and would trend toward increasing the fire survivability of these forests by reducing ladder fuels. This is based on the planned action of using wildland fire only where lower FRCCs exist.

Prescribed fire and non-fire treatments would initially result in an increase in the opportunity for the harvesting of biomass and firewood, however, a trend toward less biomass availability would eventually occur. The use of non-fire treatment methods to reduce the occurrence of ladder fuels in areas of desirable old growth forests, particularly ponderosa stands, would also decrease the fire severity and increase the survivability of old growth forests during fire events in the long-term (Howard 2003). This would increase the availability of higher economic value forest products, particularly in mixed conifer and ponderosa stands. The use of seeding and the planting of seedlings would increase the occurrence of desirable woodland types.

#### **4.2.10 Livestock Grazing**

The primary purpose of fire management actions on rangelands is to reduce fuels and the cover of encroaching undesirable vegetation species. Multiple benefits are obtained by fire and non-fire treatments. Increased production, nutrient quality and palatability of herbaceous plants are observed after a burn. Fire breaks up large tracts of sagebrush and pinyon and juniper dominated landscapes, and establishes a mosaic of vegetation types. The creation of openings and more nutritious, palatable forage would attract livestock and result in minor to moderate shifts in livestock utilization and distribution patterns.

#### **SHORT-TERM**

The Proposed Action's goals and the use of an appropriate management response to determine the suppression response to wildland fire would result in similar or slightly more acres of vegetation being burned versus the No Action Alternative during the short-term. Full suppression would still be available for use in areas susceptible to invasive species, giving the Proposed Action the flexibility to limit impacts associated with invasive species. The biggest impact to grazing after a wildland fire is the temporary loss of allotment use. Grazing would be curtailed on the impacted areas for a minimum of one growing season; rest for at least two growing seasons is required if the burned area is seeded or otherwise mechanically treated. This could cause impacts to the permittee and the need to find alternative grazing or feeding arrangements. The need for management of livestock use on a burned area is most critical the first growing season after fire, particularly in plant communities of arid and semiarid regions (Trlica 1977). Following the recovery period, impacts to livestock grazing could include increased production, nutrient quality and palatability of herbaceous plants. If livestock have

premature access to the burn, the full benefits of fire may not be realized, resulting in impacts to rangeland vegetation (Bunting et al. 1987).

Wildland fire use would have similar impacts to grazing use as would fire suppression. Grazing would be curtailed from the impacted areas for a minimum of one growing season.

Prescribed fire actions would be planned and coordinated with the permittee to lessen impacts to grazing use. The goal of a net benefit to vegetation types following prescribed fire events would improve allotment use after the recovery period. Pre-fire rest from grazing is required on many range sites to allow the accumulation of enough fine fuel to carry a prescribed fire. This is important in shrub, grass, pinyon and juniper, and forests (Jones and DeByle 1985).

Non-fire treatments including mechanical and seeding where a vegetation composition change is desired would impact permittees by eliminating grazing from an allotment for a minimum of two growing seasons. Coordination with the permittee for these planned actions would decrease the impact associated with the loss of use.

#### LONG-TERM

Long-term impacts from all fuels reduction methods in the Proposed Action are expected to make grazing resources more productive and stable. The removal of hazardous fuels would reduce the risk of severe wildfire, which would decrease the likelihood that such an event would result in longer recovery periods for impacted allotments. Wildland fire use, prescribed fire, non-fire treatments and ESR actions would affect a similar trend toward increases in ecosystem health and stability, result in improvement of grazing resources and reduce the potential for longer recovery periods.

#### **4.2.11 Recreation and Visitor Services**

The Proposed Action includes Resource Protection Measures that would preferentially protect developed Special Recreation Management Areas (SRMAs) and recreation site infrastructure from wildland fire. The potential exists for fire management actions to impact developed recreation sites and infrastructure.

#### SHORT-TERM

Developed recreation sites and infrastructure most likely to be damaged by wildfire and suppression efforts include: trails and OHV routes and associated interpretive and directional signage; dispersed camping areas; and developed facilities. Visitor experience may also be impacted by visual impacts to aesthetic qualities of the recreation area, degradation of air quality from smoke and road, trail and route closures. The most abrupt impact to potential recreationists is the complete or partial closure of recreation sites and facilities or even evacuation of those recreationists. If recreationists are allowed to enter or stay in the area, other impacts might include noise and visual impacts from ground equipment, helicopters and air tankers, firefighting equipment, and personnel. Indirect impacts of wildfire at developed facilities may include increased erosion and hazards associated with dead standing vegetation. Revegetation efforts may temporarily close areas to use. The resultant impact would be lost visitor days at developed facilities. The

Resource Protection Measures implemented would decrease the potential for impacts to developed facilities. Suppression priority would be given to higher value sites and facilities. Despite the potential adverse impacts on developed recreation sites and facilities as a result of wildland fire, a positive impact would be the opportunity to educate the recreating public regarding the role of fire in the landscape (Silverman 1993).

Wildland fire use would not be appropriate if it threatens developed recreation sites and its use is fairly limited in the Proposed Action. Therefore, potential impacts from wildland fire use would be negligible.

Prescribed fire and non-fire fuel treatments could impact the aesthetic quality of developed recreational sites and facilities. However, no impacts to the infrastructure or natural features at these sites are anticipated due to the planning required prior to implementation. Additional impacts from these actions may include temporary facility or site closures and the presence of crews performing the action. The aesthetic impacts would be temporary. Positive impacts include the removal of fuels, which left in place would create a wildfire danger to the site and facilities.

#### LONG-TERM

The use of an AMR for wildfire suppression may impact developed recreation sites and facilities by burning more of the surrounding vegetation, relative to the No Action Alternative, creating aesthetic changes to the landscape. However, a trend toward DWFC and the associated potential for less severe fire events would make the potential for the loss of these resources and visitor use days less likely. The use of wildland fire to move vegetation toward a DWFC would lessen the potential for wildland fire to impact developed recreation sites and facilities.

Prescribed burns as well as non-fire fuel treatments would reduce hazardous fuels, which reduces the risk of severe wildfire and the associated impacts to site use and site characteristics these sites are intended to utilize (NPS 2000). The reduced fuel load makes it less likely that a wildfire would burn the entire site. This increases both the level of safety for recreationists, as well as available visitor days.

#### **4.2.12 Special Designations**

The Proposed Action recognizes fire as a natural component of the ecosystem and balances that need for fire with the need to protect special designations such as WSAs, ACECs and eligible Wild and Scenic Rivers from impacts that could affect their values. Due to the Resource Protection Measures in the Proposed Action, federal laws regarding special designations impacts would be limited. Below is a qualitative description of potential effects from fire management actions in the Proposed Action.

#### SHORT-TERM

During and immediately after fire events, access to special designation areas and enjoyment of the opportunities associated with them may be restricted or impaired. Full suppression of wildland fires in these areas may be implemented to control fire size and severity, thus protecting resource values in and surrounding these special designations.

The short-term impacts from suppression efforts in areas with identified values at risk, would be much less than allowing fires to potentially burn and harm historic, scenic or

cultural values of special designations (such as ACECs). However, wildfire suppression activities could have some direct adverse impact to the abiotic and biotic components that constitute special designation areas as well as the suitability of WSAs. These short-term and limited impacts could include disturbance to soils, surfaces and groundwater, watershed functions, vegetation conditions and habitats for special status species and fish and wildlife. Impacts would be minimized by post-fire rehabilitation efforts. Appropriate management response may include limiting the use of mechanical suppression activities or other techniques for reducing impacts to special designations. Suppression may be prioritized to protect the unique values threatened by wildfire.

The Proposed Action would include wildland fire use in some special designations. Wildland fire use objectives are generally designed to minimize long-term impacts (as described below) recognizing short-term impacts.

Prescribed fire and non-fire treatments as a method to manage fuel loading and undesired vegetation may be implemented, but would be limited to protect the unique values present in special designations. Site specific treatment actions would go through environmental planning and review on impacts to naturalness and the other characteristics associated with the special designations. Prescribed fire would help maintain the naturalness of WSAs by bringing FRCC to a point allowing wildfire to play its natural role in the ecosystem.

To minimize the impairment of values associated with special designations, Resource Protection Measures have been built into the Proposed Action. Potential Wild and Scenic Rivers would be managed as directed by the Wild and Scenic Rivers Act. ESR actions would be implemented to stabilize wildfire areas and to minimize the threat of invasive and noxious weed species becoming established.

#### LONG-TERM

Long-term impacts associated with the use of an appropriate management response to wildfire suppression, wildland fire use and the planned actions of prescribed fire and non-fire fuel treatments on Special Designated area are the decreased risk of large severe wildfire events. With the removal of hazardous fuels, a trend increasing the preservation of the characteristics and values that make these designations special would be in place. In consideration of outside constraints that affect the pristine condition of these areas, the Proposed Action would result in modification of the current condition to a DWFC that may be more representative of the natural condition. Since fire is a part of the natural environment, WSA's natural character would not only be protected, but also likely enhanced.

#### **4.2.13 Socioeconomics**

Anticipated impacts of the Proposed Action to social and economic resources in the are related to physical effects to the environment such as air and water quality, wildlife habitat and private property, effects to resource uses such as grazing and forest and woodland product opportunities and effects to welfare indicators such as safety. There is considerable overlap between short-term impacts and long-term impacts. The following section reviews anticipated impacts from the Proposed Action management options.

## SHORT-TERM

Under the Proposed Action, an AMR would be implemented to maintain resource objectives. Wildfires that would threaten resource values (including WUI, cultural resources, sensitive ecosystems or infrastructure) would be controlled through suppression or their anticipated severity reduced by implementing prescribed fire and non-fire fuel treatments (discussed below). Short-term effects of wildfire and related suppression actions to social and economic resources would partially depend on the success of the selected suppression activities and the extent of burned areas relative to economic and socially important resources.

Impacts would include preservation of valued resources and private property under a scenario where suppression measures are successful. For instance, in a WUI, property values are often linked to the scenic and recreational resources of adjacent or nearby public lands. Suppression actions would have both a short-term and long-term benefit of preserving these surrounding features, thereby maintaining values. Where wildfire destroys timber and vegetation harvesting opportunities, the economic potential to local and regional communities may be reduced over the short and long-term. Other short-term effects include temporary displacement of affected populations during wildfires, economic impacts to grazing allotment permittees due to temporary loss of allotment use, altered transportation routes and disruption of subsistence activities.

Economically, suppression expenditures represent a short-term, direct cost to the BLM, but payroll to fire workers provides a short-term economic benefit to individuals and local communities.

Allowing wildland fire use would result in short-term impacts to rangeland forage availability and associated economic impacts to the allotment permittee and timber and vegetation harvesting opportunities. However, benefits realized for grazing permittees in subsequent growing seasons (generally two years and out from an event) would be realized through an increase in the quantity and quality of forage for livestock consumption. Wildland fire use can also improve the economic value of timber stands by reducing younger age classes and potential ladder fuels, which would make available more water for and reduce the potential mortality rate for older age classes of timber, respectively. However, forest product opportunities could be lost impacting the wood product industry and pinyon-nut harvesting.

Wildland fires often cause short-term increases in wildlife foods that contribute to increases in populations of some animals (Smith 2000). A general assumption is that increased habitat quality could translate to short-term surplus of game animals and thus enhance hunting opportunities. An indirect economic benefit could be realized by state game management agencies through increased hunting license sales. However, Smith (2000) notes that over time, game animal population increases are moderated by the animals' ability to thrive in the altered, often simplified, structure of the post-fire environment. When fire frequency increases or decreases substantially or fire severity changes from presettlement patterns, habitat for many animal species declines (Smith, 2000). For game animals, population increases in the short-term may be leveled out to pre-fire conditions over the long-term.

While wildland fire use would only be allowed when air quality regulatory criteria can be met, temporal effects including reduced visibility and associated travel hazards, and

general public nuisance issues related to smoke are possible. These impacts may be particularly pronounced in the WUI. However, the degree to which these impacts could occur would depend on many factors, including intensity of fire, distance from the WUI, wind direction and other climate-related factors. Air quality-related costs include reduction in tourism when fires occur in regions with tourism-based economies. Three National Park Service (NPS) studies determined that air quality conditions affect the amount of time and money visitors are willing to spend at NPS units (Brookshire et al. 1976, MacFarland et al. 1983, and Schulze et al. 1983 in Sandberg et al. 2002). Evidence from these studies suggests that economic values related to air quality and visibility may be substantial during times of high visitor use.

When wildland fire use is implemented, costs associated with deployment of firefighters are reduced. However, while this represents a benefit to the BLM, reduced expenditures translate into lost income opportunities for individuals who may have historically relied upon these types of jobs. Other short-term direct impacts to human welfare could include road closures and traffic detours, temporary public access restrictions to public recreation or subsistence-related use areas and altered landscapes.

Short-term impacts from prescribed burns used under the Proposed Action would include similar impacts to air quality, health and welfare as would be expected to occur under the wildland fire use management scenario described above. However, prescribed fires would be more controlled and thus take place under optimal weather conditions that minimize the extent and duration of impacts.

Prescribed fires would result in short-term costs to the BLM for manpower, equipment and other support services. Costs of prescribed burns vary widely depending on the size of the burn, physical factors of the area (presence of firebreaks or the need to construct fire breaks, roads and other assets) and the amount of equipment and personnel needed for the prescribed fire. Other factors that can affect prescribed burning costs include ignition type, mop-up requirements, damage from escape, smoke management, aesthetics and safety (Cleaves and Brodie 1990 in Chalmers et al. 2001). However, the costs to the agency are realized as short-term benefits to contracted workers and suppliers.

Non-fire fuel treatments would be conducted in WUI areas to better protect the areas over the long-term. The short-term welfare effects of non-fire fuel treatments may include temporary increases in noise caused by heavy equipment, dust generation and restricted access to public lands during treatment activities.

Economic benefits would be realized by contractors and equipment and material vendors. While the reduced wildland fire suppression efforts conducted under the Proposed Action may result in diminished circulation of related payroll and capital expenditures, these monies may be replaced at a lower amount by monies generated from non-fire fuel treatments.

#### LONG-TERM

Long-term impacts of wildfire and suppression efforts using the Proposed Action's AMR would result in gradual achievement of the DWFC. This trend includes a decrease in the potential for severe wildfire events, which would decrease the associated impacts discussed in the short-term discussion. Impacts to the BLM for fire management would

likely be reduced; however, this would result in diminished income opportunities to those employed in this field or to suppliers or other vendors.

Over the long-term, the Proposed Action would enhance public and firefighter safety by reducing the number of homes and other property destroyed by severe wildfires. The potential for welfare impacts, such as those that may occur in the short-term would be reduced under a more natural fire regime.

Resource-based professions would be better protected under the Proposed Action. Reducing the risk of severe wildfire would reduce the likelihood of impacts on forestry resources, tourism and grazing resources.

Under the Proposed Action, wildland fire use and prescribed fire would result in a trend toward DWFC, which would enhance public and firefighter safety by reducing the number and extent of catastrophic wildfires and reducing the number of homes and other property destroyed by severe wildfires.

Trends toward the DWFC over the long-term would reduce the costs to responding agencies for firefighting efforts, but would result in reduced income to individuals whose livelihoods depend on wildfire suppression. Such individuals would increasingly rely on other career opportunities for income, potentially resulting in a reduction of the available pool of workers needed for fire management activities.

Non-fire fuel treatments would be conducted in WUI areas and in some cases prior to prescribed fire to better protect the areas in the long-term. Potentially, public safety could increase and fewer structures would be lost to wildland fire. The reduction of hazardous fuel loads would reduce the risk of a wildland fire impacting private lands or land administered by other agencies. As a result, overall public safety and firefighter safety would be improved.

However, if over the long-term, the public perceives an improvement in wildland fire management, people that were dissuaded from moving into WUI areas due to hazards from catastrophic wildland fires might be more likely to move; thus, the Proposed Action might indirectly support increased movement into WUI areas.

#### **4.2.14 Mitigation Measures**

The Resource Protection Measures under the Proposed Action, as shown in **Table 2.3**, would minimize or avoid impacts on resources. No additional mitigation for impacts would be necessary because of the protection already afforded by the protection measures.

#### **4.2.15 Residual Impacts**

The Resource Protection Measures under the Proposed Action, as shown in **Table 2.3**, would minimize or avoid impacts on resources. There would be no residual impacts and no additional mitigation for impacts would be necessary.

#### **4.2.16 Monitoring and Compliance**

Monitoring measures that determine compliance with the Proposed Action of this plan would be instituted. This would be achieved through future planning associated with the FMPs and fire management implementation actions. These fire management actions would be evaluated for adherence to the goals and objectives established by



this Proposed Action, as well as the identified Resource Protection Measures. Implementation-level fire management actions would be developed as required and would include additional monitoring to evaluate and ensure conformance to LUP-level decisions.

### **4.3 ALTERNATIVE B: NO ACTION**

As stated in Chapter 2, the No Action Alternative would follow the existing LUPs emphasis on fire suppression. In the current LUPs there is little discussion of wildland fire use, prescribed fires and non-fire fuel treatments. The No Action Alternative generally mandates full suppression of wildland fires, with wildland fire use not addressed. The No Action Alternative allows for only limited prescribed fire and a limited level of fuel treatments, as specified in individual management plans.

#### **4.3.1 Air**

##### **SHORT-TERM**

Short-term impacts from smoke of the No Action Alternative would continue at current levels. The impacts of wildland fires and suppression efforts to air quality, NAAs, and other sensitive areas (such as Class I areas) would likely be comparable to impacts from wildland fire and suppression efforts described in the Proposed Action. Due to the limited use of wildland fire use, prescribed fire, and fuel treatments in the No Action Alternative, short-term impacts to air quality from these activities (such as smoke emissions and fugitive dust) are likely to be less than for the Proposed Action.

Similar to the Proposed Action, the No Action Alternative dictates the use of standard operating procedures including participation in the Utah Interagency Smoke Management Program, and would minimize potential air quality impacts. Applicable federal, state and local air quality regulations would not be violated due to activities planned by BLM.

##### **LONG-TERM**

Under the No Action Alternative, a trend toward more severe and uncontrollable wildland fires is anticipated. These fires have the potential to create more smoke emissions than smaller controlled fires and cannot be timed to minimize impacts to existing air quality conditions. Increased pollutant concentrations, and impacts to NAAs and other sensitive areas could increase as a result of these fires. Impacts to human health would also increase, particularly from exposure to particulate matter, with some events likely requiring special precautions be taken by the public to protect sensitive populations. The No Action Alternative's minimal wildland fire use, prescribed fire, and non-fire fuel treatments would keep direct impacts from these actions at a minimum, but allow for larger wildland fires, and accompanying smoke emissions, and trend away in the long-term from the "natural" occurrence and scale of wildfire in the planning area.

#### **4.3.2 Soil and Water**

##### **4.3.2.1 Soil**

There are no anticipated effects on soil source materials and no further discussion of this issue will be presented.

## GENERAL DESCRIPTION OF FIRE'S EFFECTS ON SOILS

The potential general effect of fire on soils is described in Section 4.2.2.1 ("GENERAL DESCRIPTION OF FIRE'S EFFECTS ON SOILS") for the Proposed Action. This description is common to both the No Action Alternative as well as the Proposed Action Alternative.

### SHORT-TERM

Due to the lack of Resource Protection Measures and an appropriate management response, soils would be at greater risk under this alternative, due to soil disturbance and compaction related to intensive fire suppression activities such as fireline construction, road construction and other uses of heavy equipment. Fewer non-fire fuel treatments and prescribed burns would occur under this alternative limiting the ground and vegetation disturbance and soil compaction resulting from these actions.

Similar to the Proposed Action, indirect impacts of the No Action Alternative include potential sedimentation of streams and reservoirs from wind and water erosion and fugitive dust from wind erosion. However, no substantial difference between the two alternatives is expected.

### LONG-TERM

Wildfires under the No Action Alternative would become increasingly larger and more severe resulting in a greater occurrence of impacts to soil resources. High severity fires would remove more of the vegetation cover and organic matter, reducing nutrient cycling. Increases in physiochemical alteration and decreases in plant-available moisture in shallow soils would occur. High severity wildfires are also more likely to adversely affect soil microorganisms, decreasing biological crusts that prevent erosion and fix nitrogen from the atmosphere. High severity fires could result in the formation of water-repellent soil layers (Robichaud et al. 2000), which can decrease infiltration and increase the energy level and quantity of runoff causing accelerated erosion and potentially debris flows. The degree of water repellency in soils following a fire is positively correlated with fire severity. These impacts would decrease the ability for soil to foster natural vegetation growth and wildlife habitat.

#### 4.3.2.2 Water

## GENERAL DESCRIPTION OF FIRE'S EFFECTS ON SURFACE AND GROUNDWATER

The potential general effect of fire on surface and groundwater is described in Section 4.2.2.2 ("GENERAL DESCRIPTION OF FIRE'S EFFECTS ON SURFACE AND GROUNDWATER") for the Proposed Action. This description is common to both the No Action Alternative as well as the Proposed Action Alternative.

### SHORT-TERM

**Surface Water** Short-term effects to surface water would be similar to those seen under the Proposed Action. Surface water would be at risk from soil disturbance and increased erosion potential related to fire suppression activities such as fireline construction, road construction and other uses of heavy equipment. This may result where wildfires are suppressed in an aggressive and focused manner, versus the Proposed Action, where lower severity and non-resource threatening fires may undergo limited suppression efforts.

Fewer non-fire fuel treatments and prescribed burns would occur under this alternative limiting the ground and vegetation disturbance, increased runoff and increased sediment loading associated with these actions.

**Groundwater** Short-term effects to groundwater would be similar to those seen under the Proposed Action. The small differences in suppression and fuel treatment actions between the two alternatives are not expected to substantially impact this resource.

**Water Quality** The use of federally mandated procedures in the vicinity of sensitive areas such as riparian and wetland, floodplain and 303(d)-listed impaired water would likely result in similarly limited impacts on water quality, as described in the Proposed Action. However, the No Action Alternative would provide less guidance and fewer restrictions and protections with respect to activities in these areas.

#### LONG-TERM

**Surface Water** Surface water resources would trend toward greater impacts under this alternative. Under the No Action Alternative, full suppression of wildfires would remain the principal response to wildland fires. The effort to fully suppress wildfire could lead to an increase in fuel loads. This may result in the increase of uncontrollable high severity fires, which would degrade floodplain health and the functioning condition of watersheds. This would be apparent in an increase in the loss of vegetation cover and organic matter, degradation of sustainable stream banks and widths and more erosion. The effect would be increases in dissolved and suspended solids, nutrients and temperature variations outside of normal conditions.

**Groundwater** The increasing occurrence of high severity fires could decrease the amount of precipitation able to infiltrate into the subsurface. The water that does make it into the subsurface could have an increased nutrient load obtained as it passes through burned vegetation and physiochemically altered shallow soils. The impact to groundwater would be dependent on the depth to groundwater below ground surface and the type of sediments or bedrock it passes through. The change in the infiltration capacity of the soil would be dependent on the fires severity, soil type and pervasiveness of vegetation root structures.

**Water Quality** The use of already established procedures in the vicinity of sensitive areas such as riparian and wetland, floodplain and 303(d)-listed impaired water would likely result in similar limited impacts on water quality as in the Proposed Action. However, the expected increase in severe and uncontrollable wildland fires would make the ability to follow these guidelines less probable resulting in a decrease in water quality during and following these events. The effect would be increases in dissolved and suspended solids, nutrients and temperature variations outside of normal conditions.

#### 4.3.3 Vegetation

##### SHORT-TERM

Though direct impacts on vegetation types are similar to those described by the Proposed Action, how fire is managed and the tools available for vegetation and fuel treatments differ. Full suppression of wildland fire, no wildland fire use and limited prescribed fire and non-fire fuel treatments under the continuation of existing management would result in a continued departure from historic and desirable fire conditions. Rather than emphasizing the proactive management approaches

identified in the Proposed Action to improve FRCCs across various vegetation types, the primary management tools available under existing fire management direction would be limited mainly to emergency stabilization and rehabilitation associated with wildland fire.

#### LONG-TERM

Long-term impacts would be extensions of existing and ongoing trends associated with current management. However, the potential exists in some vegetation types for catastrophic ecological effects as thresholds are crossed (e.g., there may come a point where establishment of annual grasslands expands to a point that is essentially irreversible or uncontrollable given available management tools and resources). The number of acres burned and severity of fire would continue to increase across all vegetation types in future years due to the lack of emphasis on treatment of hazardous fuels. This would result in increasing demands for rehabilitation and treatments as FRCCs continue to trend further away from ecological sustainability.

The continued lack of natural fire on the landscape coupled with the relatively small number of acres subject to hazardous fuel treatments would continue to change the composition and structure of vegetation communities and eventually reduce native plant diversity and associated resource values. Fuel loadings would also continue to increase in most vegetation types. Fire-dependent plant communities would continue to deteriorate as a result of continued fire suppression. FRCC would continue to trend to higher condition classes and the risk of losing key ecosystem components would continue to rise across most vegetation types. Indirect impacts to vegetation through the loss of organic and water content of soil and other physiochemical soil changes would increase, affecting the ability for native vegetation to become established after severe fires and decreasing biodiversity due to the spread of opportunistic non-native species.

**Salt Desert Scrub** Invasive species, especially cheatgrass would continue to spread into this community. Vegetation conditions within this vegetation type would remain at FRCC 3, but continued expansion of cheatgrass would eventually increase fire frequency and severity, resulting in ongoing, potentially accelerating, loss of native salt desert scrub communities.

**Pinyon and Juniper Woodland** The vegetation in this community would continue to encroach into and displace rangelands, shrublands, and low- to mid-elevation forests creating even larger, homogenous stands of pinyon and juniper. This would lead to increasingly large, severe, undesirable wildland fires and further exacerbate invasion by cheatgrass and other exotic annuals (USDA Forest Service 1997). FRCC would continue to increase and existing FRCC 2 areas would trend toward FRCC 3 areas.

**Sagebrush** Given current conditions and trends, the displacement of native herbaceous understory species by cheatgrass and other exotic annuals would continue, particularly in low-elevation sagebrush communities. Pinyon and juniper would continue to invade this ecosystem (USDA Forest Service 1997). Regardless of any rehabilitation and/or restoration efforts to successfully reduce FRCC in low-elevation sagebrush, the lack of available fire and fuels management tools under the No Action Alternative would limit further recovery of this ecosystem. In areas where pinyon and juniper have not invaded, high elevation sagebrush stands would continue to increase

in age and density, creating homogeneous, even-aged, late seral stands. Biodiversity would continue to decrease as the native herbaceous understory is displaced by cheatgrass or shaded out by increasingly dense canopies of sagebrush and/or pinyon and juniper. On-going range improvement projects may offset these trends to some extent, but are not projected to treat nearly as many acres and would not effectively integrate fire use into management of this ecosystem.

**Grasslands** Given current conditions and trends, native perennial grasslands would continue to be displaced as cheatgrass, other invasive species, sagebrush and pinyon and juniper continue to invade this ecosystem (USDA Forest Service 1997). Net acreage of native grasslands would continue to decline and FRCCs would continue to deteriorate in all grassland vegetation types susceptible to cheatgrass invasion or juniper encroachment.

**Cheatgrass** Treatment options to control cheatgrass are limited under the No Action Alternative and increasingly large and severe wildfires would continue to promote cheatgrass infestation and increase its dominance. Left unchecked, cheatgrass expansion has the potential to reach a threshold of irreversibility, where the sheer scale and fire ecology dynamics of cheatgrass dominance render it virtually impossible to control with available techniques and resources.

**Blackbrush** Invasive species would continue to spread into this community. These species provide fuel and may increase fire frequency and severity, which would likely result in loss of blackbrush communities. FRCC would likely trend from FRCC 2 toward FRCC 3 as cheatgrass invasion becomes more widespread in this vegetation type.

**Mountain Shrub** Many mountain shrub communities would continue to be encroached upon and converted to pinyon and juniper woodland. This would increase the potential for uncharacteristically large and severe wildland fires and would result in a gradual decline in health of native mountain shrub communities. As a fire-adapted ecosystem, without the rejuvenating benefits of periodic fire, the diversity of successional stages of existing mountain shrub communities across the landscape would remain skewed toward late mature or decadent stands (USDA Forest Service 1997). This would continue to trend FRCC in mountain shrub vegetation types toward FRCC3.

**Mixed Conifer** Given recent conditions and trends, shade-tolerant fir species would continue to move toward dominance. Stand replacement fires in mixed conifer forests outside the historical range of intensity and severity are likely because of the continued growth of ladder fuels and accumulation of heavy fuels (Bradley et al. 1992). White fir is expected to continue to increase in density due to the lack of frequent, low-severity fire, setting the stage for future insect outbreaks and more severe fires (USDA Forest Service 1997). Over time, insects and diseases in these conifers may increase fuels levels to a point where fires that do occur would likely burn outside the historic range of variability in terms of the severity and the aerial extent of burn. FRCC would likely trend toward increased representation of FRCC 2 and FRCC 3.

**Ponderosa Pine** Given current conditions and trends, this ecosystem would continue to convert, in some areas, to Douglas-fir or white fir, and pinyon and juniper would continue to encroach into this vegetation type. Stands would continue to increase in density, creating homogeneous, even-aged conditions that were rare or nonexistent prior to suppression. The continued growth of ladder fuels and accumulation of heavy

fuels would lead to uncharacteristically large and severe wildland fires (Bradley et al. 1992, Covington and Moore 1992, USDA Forest Service 1997). As Utah BLM managed ponderosa pine communities are already in FRCC3, no further change in FRCC would occur although the degree of departure from historical fire patterns would continue to increase.

**Riparian and Wetland** Flammable invasive species (e.g., tamarisk) would continue to increase, which may increase fire frequency and severity. In particular, low elevation riparian areas would continue to be at risk of degradation and departure from historic fire regimes due to invasive species.

**Creosote and Bursage** Invasive annual grasses would continue to spread into this community. FRCC for this vegetation type would likely deteriorate from FRCC 2 to FRCC 3. Continued expansion of cheatgrass and red brome would increase fire frequency and severity, potentially resulting in ongoing loss of native creosote and bursage communities through conversion to annual grasslands.

**Aspen** Existing aspen stands would continue to be encroached upon and overtopped by conifer species and trend further toward skewed representation by late mature and decadent stands. FRCCs would likely deteriorate from FRCC 2 to FRCC 3 as departure from historic fire return intervals increased along with fuel loadings. Aspen stands would be increasingly susceptible to higher severity fires that could potentially result in higher amounts of soil organic matter being consumed by fire and reduced post-fire sprouting and regeneration of aspen. In some areas, increased mortality of aspen clones due to higher severity fires could limit post-fire recovery of aspen stands. Ultimately, representation of aspen as a component of the vegetation mosaic across the landscape would decline further in the absence of periodic fires.

#### **4.3.3.1 Noxious Weeds**

##### **SHORT-TERM**

There would be no effect from No Action on noxious weeds in the short-term.

##### **LONG-TERM**

A dramatic increase in the range of invasive weeds is expected to continue. The likelihood of larger and more severe wildfires under the No Action Alternative would allow invasives like cheatgrass to progressively colonize new areas. More aggressive seeding and rehabilitation programs would be required to control infestations.

#### **4.3.4 Special Status Species**

##### **SHORT-TERM**

Under the No Action Alternative, the BLM would continue its current fire management practices. The BLM would still be required to conduct Section 7 consultation with USFWS for all site-specific fire management activities implemented within suitable or potentially suitable habitat for federally listed species. The Alternative Consultation Agreement to Implement Section 7 Counterpart Regulations could be employed on projects that support the National Fire Plan.

Because wildfire suppression under the No Action Alternative would consist of full suppression in most cases, short-term impacts from burning could be less than under the

Proposed Action where some acres would be considered appropriate for potential wildland fire use. Short-term impacts (e.g., habitat modification, plant mortality and/or displacement of animal individuals or populations) from actual suppression activities would be similar.

Though prescribed fire would be limited under the No Action Alternative, short-term impacts would be similar to those under the Proposed Action. Both alternatives would require consultation with the USFWS prior to implementation activities, which would ensure protection of species and their habitat. Accordingly, few adverse impacts to species (plant and animal) and their habitat would likely occur.

Under the No Action Alternative, few acres of non-fire fuels reduction treatments would occur. For those that would occur, Resource Protection Measures are either nonexistent or outdated. Therefore, short-term impacts associated with ground disturbance and potential for noxious weed infestation could occur.

#### LONG-TERM

Long-term ecosystem-wide beneficial effects of the Proposed Action on special status species and their habitat would not be attained under the No Action Alternative. With implementation of full suppression efforts in many cases, fuel loading would continue to increase and the subsequent risk of a severe wildfire would increase. Indirect adverse effects (from changes in vegetation composition and structure caused by aggressive fire suppression and potentially severe wildfires) to individuals, populations and habitats would continue.

#### 4.3.5 Fish and Wildlife

##### SHORT-TERM

Because wildfire suppression under the No Action Alternative would consist of full suppression in most cases, short-term impacts from burning could be less than under the Proposed Action where some acres would be considered appropriate for wildland fire use. Short-term impacts (e.g., introduction of toxic materials into the ecosystem, habitat modification, plant mortality and/or displacement of animal individuals or populations) from actual suppression activities would be similar.

Because prescribed fire would be less under the No Action Alternative, short-term impacts would be similar to those listed for the Proposed Action, only to a lesser degree. Less direct, adverse impacts to fish and wildlife species and their habitat, would occur.

Under the No Action Alternative, fewer acres of non-fire fuel reduction treatments would occur. Therefore, short-term impacts associated with ground disturbance and potential for noxious weed infestation (i.e., alteration of habitat, particularly habitat used for foraging) would be less than under the Proposed Action.

**Fish** Direct effects could occur from wildfire suppression, including the introduction of fire retardant, aviation fuel, or lubricants into streams and wetlands; erosion of exposed soils from fireline construction on steep slopes adjacent to streams; damaged riparian vegetation and soils (resulting in erosion) from the use of heavy equipment and establishment of fire camps; and reduced natural stream flow during drafting and pumping. If they occurred, these impacts would adversely impact water quality of various fisheries throughout the state. The collective short-term impacts of increased

sedimentation (from erosion) could have watershed-wide effects including changes in temperature, turbidity and water chemistry.

**Non-Game and Big Game Species** Short-term adverse impacts (e.g., direct species mortality, habitat destruction and habitat displacement) would likely affect suitable habitat utilized by raptors, migratory birds, small mammals, carnivores and predators, and amphibians and reptiles, as well as a variety of habitats associated with big game species.

Direct effects from wildfire suppression could include the introduction of fire retardant, aviation fuel or lubricants into any occupied or potentially suitable habitat; erosion of exposed soils from fireline construction on steep slopes; and damaged vegetation and soils from the use of heavy equipment and establishment of fire camps. Direct effects from prescribed fire and non-fire fuels reduction treatments could include individual mortality to plant or animal species, habitat destruction, or species displacement.

In addition to direct impacts, indirect impacts could include increased sedimentation and subsequent habitat modification as a result of scorched soil and upstream erosion.

#### LONG-TERM

Although short-term adverse impacts from wildfire suppression, prescribed fire, and non-fire fuels reduction treatments would be less under the No Action Alternative than under the Proposed Action, long-term beneficial effects would also be less. Specifically, more extensive use of wildfire suppression activities and a lack of applicable and up-to-date Resource Protection Measures would increase the potential for noxious weed establishment over time, thereby modifying wildlife habitat (particularly habitat that would otherwise provide forage resources). Additionally, a greater risk of severe wildfire would result because fuels would not be allowed to burn, or treated. Adverse long-term impacts individuals, populations, and habitats would continue due to changes in vegetation composition and structure.

**Fish** Long-term adverse impacts to fisheries could include alteration of habitat quality from repeated short-term impacts, and an increasing risk of severe wildfire and, subsequent adverse impacts.

**Non-Game and Big Game Species** The long-term effects on fish and wildlife species would be similar to the long-term effects described for special status animal species.

Because wildland fires would primarily be suppressed under the No Action Alternative, and prescribed fire and non-fire fuels reduction treatments would not likely consist of large treatment areas, the overall condition of the landscape would continue to be far-removed from its natural fire regime and the build up of hazardous fuels would continue with an increase in severe fires and the associated alteration of habitats.

#### 4.3.6 Cultural Resources

##### GENERAL DESCRIPTION OF FIRE'S EFFECTS ON CULTURAL RESOURCES

The potential general effect of fire on cultural resources is described in Section 4.2.6 ("GENERAL DESCRIPTION OF FIRE'S EFFECTS ON CULTURAL RESOURCES") for the Proposed Action. This description is common to both the No Action Alternative as well as the Proposed Action Alternative.



## SHORT-TERM

Under the No Action Alternative in a short-term scenario, fuel loads would likely continue to increase. The potential for severe wildland fires is similar to that in the short-term under the Proposed Action. However, a more concerted effort to suppress wildland fires under the No Action Alternative would occur that would increase the likelihood of impacts to cultural resources. This includes impacts to traditional cultural properties and areas of Native American religious concern. Assuming suppression efforts are successful, follow up restoration and rehabilitation actions would be smaller in acreage than under the Proposed Action subjecting cultural resources to fewer potential impacts.

Wildland fire use is not addressed in the No Action Alternative, so suppression-related impacts would increase where a fire might otherwise be allowed to burn under the Proposed Action. Prescribed fire and non-fire fuel treatment methods would be conducted on a smaller scale. This would, in the short-term, potentially decrease the impact to cultural resources from ground disturbing activities.

## LONG-TERM

With the continued buildup of hazardous fuel loads, wildland fire is expected to trend toward larger and more severe events. The impact of these severe events would be increased to cultural resources such as archaeological values and traditional Native American vegetation collection or ceremonial use sites. The inability to use wildland fire and a low amount of planned fuel reduction treatments would exacerbate this trend. These events would have a greater likelihood of damaging cultural resources than the Proposed Action. In addition, aggressive suppression efforts would be required to control the impacts from severe events, increasing the potential for impacts to cultural resources from ground disturbing activities. Extensive restoration and rehabilitation actions would be required following these events, increasing the need for more cultural evaluations to minimize impacts from restoration and rehabilitation actions.

As mentioned in the short-term, wildland fire use is not an option, so the potential for suppression related impacts could occur at a greater frequency than in the Proposed Action. Prescribed fire and non-fire fuel treatment methods would be conducted on a smaller scale than under the Proposed Action. While decreasing the impact to cultural resources from ground disturbing activities, it would exacerbate the trend toward an increase in hazardous fuel loads. This would result in larger more severe fires and more aggressive suppression efforts to contain them. The trend toward the occurrence of wildland fire outside of its historic and prehistoric severity range would make archaeological features that may have survived many fire events more prone to destruction. The higher severity fires may make areas used by Native Americans for religious purposes more prone to longer lasting alterations to the landscape and the values Native Americans place on them.

### **4.3.7 Visual Resources**

## SHORT-TERM

Under the No Action Alternative, current management would be continued. Current fire management generally mandates full suppression of wildland fires, with wildland fire use not being addressed. The continued suppression of wildfire would increase

hazardous fuels accumulation and could increase the risk of a severe wildfire. Short-term effects of full fire suppression activities could change the landscape to clearly appear altered by man. For example, a bladed fireline may create a visual contrast that would make human intervention apparent. Potential visual effects from a severe wildland fire may include loss of trees, blackening of the landscape, blackened deadfall, including the disruption of line and form from ground disturbing activities. Large areas, including areas in VRM Classes I and II, could be blackened and charred and large amount of smoke would be produced.

The use of prescribed fire and non-fire fuel treatments is currently limited. Regardless, the short-term effects of specific prescribed fire and non-fire fuel treatments are likely to be similar, but decreased, compared to the effects described in the Proposed Action. As in the Proposed Action, short-term effects would be evaluated with respect to long-term benefits.

#### LONG-TERM

Under this alternative the trends of increased risk and hazard due to the accumulation of fuels would be likely to continue for all VRM classes, with large and severe wildland fires potentially burning and charring visually sensitive areas.

#### **4.3.8 Naturalness, Solitude and Primitive Recreation**

##### SHORT-TERM

Under current planning, the role of fire as a natural and important component of the ecosystem has not been fully acknowledged nor has the appropriate response to naturally-ignited fires been identified. Under the No Action Alternative, the focus on fire management would continue to be on full suppression with no Resource Protection Measures in place to minimize the impact of these efforts on wilderness character values. Short-term impacts from wildland fire suppression could, therefore, be more severe than those anticipated by the Proposed Action, potentially impairing the value components of these areas. Wildland fire use is not allowed in existing land use plans.

##### LONG-TERM

The No Action Alternative would result in continuation of the current condition: a trend towards away from the natural condition. The lack of wildland fire use in these areas and its ability to enhance the historic fire regime would continue to trend conditions toward larger and more severe fire conditions. Since a continuation of the current undesired fire regime and vegetation condition would be accommodated by this alternative, a long-term adverse impact to naturalness and supporting supplemental values associated with wilderness character lands would likely result. Subsequent opportunity values for solitude and primitive and unconfined recreation may be impaired as well.

#### **4.3.9 Forestry**

The majority of forests in the planning area consist of pinyon and juniper woodland that have minimal economic forestry values, as discussed in Chapter 3. The following qualitative discussion presents impacts to the resource if No Action Alternative is taken.

##### SHORT-TERM

Short-term impacts would continue on a trend of pinyon and juniper encroachment due to full fire suppression. The availability of biomass and forest product opportunities would continue to increase for pinyon and juniper. In addition, an overall increase in ladder fuels in the form of densely stocked mixed conifer species would increase competition for water, thereby stressing large ponderosa stands making them more susceptible to wildfire, insects and disease (Keyes et al. 2003). The overall impact of existing management goals would lead to the periodic occurrence of larger, more severe and less controllable wildfires with the associated loss of biomass and healthy forest conditions, and forest product opportunities.

Wildland fire use is not an option in existing management goals. The lack of wildland fire use in appropriate areas would increase the amount of biomass and forest product opportunities in the short-term. The absence of wildland fire use and the presumed suppression of those fires would result in the continuing accumulation of fuel loads and a corresponding increase in the likelihood of large severe wildfires.

Prescribed fire and non-fire fuel treatments would be less than the Proposed Action, which would leave more biomass and forest products available for harvesting. However, with a decreased emphasis on non-fire fuel treatments and associated use of public and commercial entities to assist in the treatments, less of these potentially available forest product opportunities would likely exist.

#### LONG-TERM

Long-term impacts due to wildfire suppression would be similar to the short-term impacts. Wildland fire use would not be an option, which would exacerbate the problem of fuel loading over time. The smaller amount of prescribed fire and non-fire fuel reduction treatments would likewise continue the trend of making forest areas more susceptible to larger and more severe wildfires, with the associated loss in biomass and forest product opportunities.

#### **4.3.10 Livestock Grazing**

##### SHORT-TERM

The goal of full suppression of wildfire and the lack of wildland fire use in the No Action Alternative would protect allotment use in the short-term. However, an improvement in the quality of grazing conditions and ecosystem health and stability would not be realized. Also, an increase in fuel loading, particularly in unpalatable species, would continue to increase the likelihood of severe wildfires. Allotment recovery periods following wildfire and wildland fire use would remain similar to the Proposed Action and no impacts to allotment use, substantially different than described under the Proposed Action, are expected to occur.

Prescribed fire and non-fire fuel treatments would be conducted on a smaller scale than in the Proposed Action. While minimizing the short-term impacts to allotment use by not doing these actions, a continued trend in increasing fuel loads would remain.

##### LONG-TERM

Full suppression of fires would result in a trend toward increased hazardous fuels, which would increase the risk of severe, uncontrollable wildfire. This may lead to the loss of allotment use for longer periods of time than under the Proposed Action. Severe wildfire

would result in a loss of seed banks and physical and chemical degradation of soil that negatively impacts an allotment's ability to recover after wildfire.

The lack of wildland fire use and the lower level of prescribed fire and non-fire treatments in areas with grazing allotments would trend away from DWFC. This may lead to more and larger wildfires, which are harder to control and have a more damaging impact to grazing resources and the associated allotment use.

#### **4.3.11 Recreation**

##### **SHORT-TERM**

The impact to recreational sites and facilities from wildland fire suppression under the No Action Alternative would be similar to the Proposed Action. The widespread management goal of full suppression of wildfire would increase the preservation of recreation infrastructure. The lower level of prescribed fire and non-fire fuel reduction treatments, particularly surrounding sites and facilities, would create an increasing trend of hazardous fuel loads compared to the Proposed Action.

##### **LONG-TERM**

Under the No Action Alternative, the emphasis on full suppression would aim to protect developed sites, facilities and the surrounding area. The lower levels of planned fire and non-fire fuel treatments, relative to the Proposed Action, would continue the current trend of increasing hazardous fuel loads. In addition, many of the developed sites and facilities have the potential to have numerous ignition sources (campfires, improper disposal of cigarettes, vehicle exhaust systems, fireworks, and others) creating a situation where potential for impacts to infrastructure and recreationist safety would greatly increase with time.

#### **4.3.12 Special Designations**

##### **SHORT-TERM**

The No Action Alternative would result in continuation of the current fire management direction. Existing management includes an emphasis on full suppression, no wildland fire use and limited hazardous fuel treatments. The impacts from these actions would not differ greatly in the short-term from those experienced in the Proposed Action. However, the potentially greater focus on suppression efforts may decrease the amount of special designation areas that burn in severe fire.

##### **LONG-TERM**

This alternative would likely continue to trend toward increased hazardous fuels in or around special designation areas. If heavy fuel loads were ignited, then a fire of high severity and temperature could damage historic, cultural or scenic values associated with special designations. Suppression efforts implemented to protect these areas would become more aggressive and may require infringement on WSA values to protect other values present. This may involve the occurrence of ground disturbing activities in and around special designation areas, including large fire camps within areas managed for solitude and primitive recreation and fireline establishment. Excluding fire from playing its natural role in ecosystems, as set forth in the No Action Alternative, is counter to managing wilderness areas for naturalness.

#### **4.3.13 Socioeconomics**

##### **SHORT-TERM**

Full fire suppression would continue under the No Action Alternative. The primary impacts from continuing the current fire management practices are risks to public and firefighter safety during fire suppression activities. In the short-term, full suppression would prevent the immediate destruction or loss of use of resources (e.g., timber, grazing allotments, or businesses). Fire suppression costs, watershed rehabilitation costs, costs of health impacts (particularly from air quality effects), altered transportation patterns, altered landscapes and impacts on subsistence activities would still occur under the No Action Alternative. The No Action Alternative does not place a protection emphasis on WUI.

Under this alternative, wildland fire use would not be a tool used for fire management. Prescribed fire would still occur, but to a lesser degree than under the Proposed Action. Costs to the BLM for prescribed burns would consequently be less; however, income to contracted individuals and suppliers would also be reduced. The short-term impacts of non-fire fuel treatments occurring under the No Action Alternative would be the same as those under the Proposed Action, except that the number of such treatments would be fewer if the Proposed Action is not implemented.

##### **LONG-TERM**

Over time wildfires would tend to grow larger in size, intensity and severity due to unnatural fuel loading conditions. Nonetheless, the movement of people into WUI areas is expected to continue. The threat to WUI areas from severe or catastrophic wildfire would continue to increase as the WUI areas themselves increase in number and in size. Under the No Action Alternative, protecting communities and private parcels from wildfire would become increasingly more difficult and expensive. Severe wildfires are difficult to contain and pose a greater threat to firefighter and public life and safety.

Severe wildfires burn with such severity that the ecosystems may be drastically changed. Economic impacts would arise both directly from fire damage and indirectly from changes in local economic activity, such as a drop in tourism. Both direct and indirect effects of wildfires would exact a heavy economic toll on many communities. Wildland fires would burn both public and private lands over a broad spectrum of rangeland and forested ecosystems, often encompassing and endangering entire watersheds critical to community water supplies. These burned lands would be susceptible to the establishment of undesirable invasive or noxious weeds. The cost to eradicate unwanted invasive species such as cheatgrass could be substantial.

Wildland fires would temporarily stimulate local economies through the influx of federal and state funds, both during the fire and after the fire through rehabilitation activities.

#### **4.4 CUMULATIVE IMPACTS ANALYSIS**

Cumulative impacts are defined in the CEQ NEPA implementing regulations (40 CFR Part 1500-1508) in §1508.8 as:

"The impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

Past actions that have affected the resources in the planning area are reflected in the “Affected Environment” section in Chapter 3. Present, ongoing and reasonably foreseeable actions are included in the “Reasonably Foreseeable Action Scenario” described below.

#### **4.4.1 Reasonably Foreseeable Action Scenario**

The following reasonably foreseeable actions and natural events were identified that may contribute cumulative impacts to the project. Reasonably foreseeable actions are planned or proposed, not speculative or in the distant future. They also include continuation of recent trends in use. The interdisciplinary team has identified the following actions as reasonably foreseeable:

- National Fire Plan activities for federal and state land management agencies
- Land and Resource Management planning throughout Utah
- Continuing implementation of Utah BLM’s Rangeland Health Standards and Guides
- BLM’s 13 Western States Vegetation Environmental Impact Statement (revision in process)
- Regulatory actions and guidance for sagebrush restoration
- TMDL planning
- Continued increase in WUI
- Increase in motorized and non-motorized recreational use of BLM lands
- Continued expansion of mineral extraction activities including oil and gas
- Ongoing growth and development throughout the planning area
- New coal-fired power plants
- Utility corridor development
- Continued and increased noxious weeds infestation
- Continued human-caused and natural ignitions

##### **4.4.1.1 Air**

###### **PROPOSED ACTION**

Implementing the National Fire Plan across Utah would cause additional short-term localized increases in particulate emissions from planned ignitions. However, a long-term reduction in the risk of violations of air quality standards from large, uncontrolled smoke emissions would occur. Increased motorized recreational use, ongoing growth and development and new coal-fired power plants throughout the planning area would contribute particulate matter emissions and fugitive dust emissions. Increased recreational use may increase human-caused ignitions, which, in the short-term may add to emissions.

Since the Proposed Action contains measures to avoid violating air quality standards, increases in smoke emissions would be considered in planned actions. Long-term

reduction in the risk of smoke emissions from unplanned fire would help to offset the increased emissions from development and recreational use. Implementing the National Fire Plan on other agency lands and on BLM lands would cumulatively increase planned actions and increase emissions during the spring and fall when most prescribed burning is completed.

#### NO ACTION

Cumulative effects of No Action are similar to cumulative effects of the Proposed Action in the short-term.

In the long-term, under No Action the increased risk of more emissions from large, unplanned wildfires would combine with additional emissions from increased recreational use of off highway vehicles (OHVs), use of automobiles to access recreational areas, development and coal-fired power plants to increase impacts to air quality and visibility than is currently experienced.

#### 4.4.1.2 Soil and Water (including floodplains and riparian and wetland zones)

##### PROPOSED ACTION

Reasonably foreseeable actions may contribute to cumulative effects on soil and water by following Rangeland Health Standards and Guides that reduce impacts from grazing and improve soil and vegetation conditions. Implementing Rangeland Health Standards and Guides combined with the BLM's Vegetation EIS would improve water quality, reduce soil compaction, reduce soil loss and reduce noxious weed infestation.

**Soil** Effects of the Proposed Action (long-term reduction in soil loss, erosion, compaction and damage to soil crust, and less risk of altered porosity and infiltration rates) would be added to the effects from reasonably foreseeable recreational use and noxious weeds, but the Proposed Action would help to minimize the total negative effects. Forthcoming regulations on water quality (TMDLs), the National Fire Plan being implemented on a large scale and the revised BLM Vegetation EIS would improve soil conditions when combined with the long-term effects of the Proposed Action.

**Water** The impact on surface water, groundwater and water quality would translate into an increase in soil stability, woody debris and stream bank vegetation, bank and channel stability, surface water infiltration to replenish the groundwater supply and functionality of floodplains. Cumulative effects from recreational use, noxious weeds, and mineral extraction would continue to have negative sediment load effects. The implementation of Rangeland Health Standards and Guides, water quality (TMDLs) regulations, and restrictions on OHV use would improve water quality and supply when combined with the long-term effects of the Proposed Action.

##### NO ACTION

**Soil** There would be an increasing risk over time of loss of vegetation cover and organic matter and an increase in erosion, along with a reduction in microorganisms and infiltration on BLM lands which would be minimally offset by implementation of the National Fire Plan by other agencies. Cumulative effects from reasonably foreseeable actions would exacerbate these problems with the exception of the improvements made when regulations decrease impacts. Overall, the trend for soil condition under this alternative would be downward.

**Water** Cumulative effects of the No Action Alternative would generally have negative effects on surface water, groundwater and water quality, largely from increasingly severe wildfires. Infiltration may be increased or reduced, affecting groundwater. Large scale implementation of the National Fire Plan, by other agencies and improvements made when regulations decrease impacts would have the same positive benefits as described under the Proposed Action. However, they would not occur on BLM lands, which are 40 percent of the cumulative effects area. This would cause a long-term lack of improvement in water quality. Effects from other reasonably foreseeable actions would exacerbate these problems. Overall, the trend for water would be downward with increased alteration of natural hydrologic systems.

#### **4.4.1.3 Vegetation (including invasive and non-native species management)**

##### **PROPOSED ACTION**

Reasonably foreseeable actions may contribute to cumulative effects on vegetation. Implementation of the Rangeland Health Standards and Guides would improve the health of upland and riparian vegetation. Community growth, resulting in increased WUI would increase conversion of land available for native species habitat to other uses (e.g., agriculture, landscaping). Increased recreational use and development for mineral extraction may contribute to the continued spread and introduction of noxious weeds. This may offset gains in the control of invasive species potentially seen with implementation of the Proposed Action.

As with the Proposed Action, large scale implementation of the National Fire Plan and the revised BLM Vegetation EIS would result in limiting and reducing cheatgrass invasion, reducing the risk of large scale catastrophic fires, lowering FRCCs, preventing further juniper encroachment, recovering native vegetation communities, preventing further loss of fire-dependent vegetation communities and promoting a healthier, more diverse vegetation mosaic. However, the Proposed Action would contribute cumulatively to the overall improvement of vegetation health.

##### **NO ACTION**

Effects of implementing the National Fire Plan on a large scale would occur as described above. However, since those effects would not occur on 40 percent of the lands in Utah the overall effectiveness would be reduced considerably, particularly in the WUI. The trend to a higher FRCC would continue in a large portion of the state. Implementation of the Rangeland Health Standards and Guides would improve some components, but are not likely to be able to overcome the negative impacts on vegetation caused by the No Action Alternative.

Community growth, resulting in increased WUI would compound the management problem of increased fuel loadings and an associated increase in undesirable and invasive vegetation species and make fire management on adjacent BLM lands more expensive. Increased recreational use and future development for mineral extraction may contribute to the continued spread and introduction of noxious weeds which would exacerbate the problem of cheatgrass, red brome and other invasives.



#### **4.4.1.4 Special Status Species**

##### **PROPOSED ACTION**

Increased vegetation treatments, recreation, mineral development, population growth and urban development could cumulatively impact special status species. Special status species could be subject to temporary displacement and habitat alterations from reasonably foreseeable actions, but BLM-executed actions (and other federal actions) would be planned to avoid and minimize the impacts on special status species and their habitat. Noxious weeds could, however, affect the habitat of some species.

The short-term adverse impacts of the Proposed Action would be offset by long-term beneficial effects of rehabilitation activities (large scale implementation of the National Fire Plan, the BLM Vegetation EIS and Rangeland Health Standards and Guides) and reduction of hazardous fuels (following a prescribed fire, non-fire treatment or implementation of wildland fire use). The subsequent, gradual return to a more natural fire regime would result in long-term improvement in special status species habitat. Hazardous fuels would be reduced, which would reduce the risk of large, catastrophic fire events, including the risk of habitat alteration.

##### **NO ACTION**

Impacts from reasonably foreseeable actions would be as described under the Proposed Action. Additionally, although short-term adverse impacts would be minimized under the No Action Alternative, the long-term risk of severe wildfire (and associated risk to special status plants and animals and their important habitat) would continue on the BLM lands. Disturbance and habitat quality impacts from reasonably foreseeable actions would contribute to negative impacts to special status species.

#### **4.4.1.5 Fish and Wildlife**

##### **PROPOSED ACTION**

Reasonably foreseeable actions would subject wildlife to temporary displacement and habitat alterations. In the long-term, overall hazardous fuel reductions associated with the Proposed Action and large scale implementation of the National Fire Plan and BLM's Vegetation EIS would gradually reduce the risk of a severe fire event and restore ecosystems that reflect more natural conditions. Since planned actions in the Proposed Action would be timed to avoid and minimize the impacts on critical habitat and breeding seasons, the Proposed Action would contribute minimal effects to those of the reasonably foreseeable actions. Therefore, the net cumulative effects from the Proposed Action on fish and wildlife and their associated habitat would be minor.

##### **NO ACTION**

Reasonably foreseeable actions would have similar effects as described under the Proposed Action. In addition to these, the No Action would contribute adverse impacts (from long-term changes in vegetation composition and structure caused by aggressive fire suppression and potentially severe wildfires) to individuals, populations

and habitats. The cumulative effects of the No Action Alternative would generally be adverse to wildlife and their habitats.

#### **4.4.1.6 Cultural Resources (including Native American religious concerns)**

##### **PROPOSED ACTION**

Reasonably foreseeable actions include increased recreational use, WUI, vegetation treatments, WUI, population growth, and mineral resource development in areas containing cultural resources. This would include an associated increase in vandalism, artifact collection and destruction, and alterations to landscape characteristics valued in Native American religious beliefs and practices.

The Proposed Action would reduce the impacts that wildfire and wildfire suppression have on cultural resources in the long-term; however, in the short-term more artifacts may be revealed following fire. Cumulative effects activities would add to the disturbance, possible destruction, or removal of cultural artifacts. Existing regulations and protocols should help reduce the impacts on cultural resources. Ongoing growth and an increase in the WUI may alter fire management activities, which, under the Proposed Action would consider the impacts and protect cultural resources.

##### **NO ACTION**

No Action would, in the long-term, increase the impacts that wildfire and wildfire suppression may have on cultural resources. Cumulative effects activities would add to the disturbance or removal of artifacts and the alteration of attributes Native American's consider important in the practice of religious beliefs. Ongoing growth and an increase in the WUI may alter fire management activities, including added pressure to suppress more wildfires, which, under the No Action could lead to more loss or damage of cultural resources.

#### **4.4.1.7 Visual Resources**

##### **PROPOSED ACTION**

Reasonably foreseeable actions may affect visual resources through increased recreational use, other vegetation treatments, impacts from new coal-fired power plants, and through other growth and development activities. Development of lands for oil and gas extraction and for utility corridors is expected to expand the road network on agency land and linear features containing a modified reclamation vegetation type or mix relative to the surrounding landscape. These actions would magnify impacts to visual resources due to fire management related actions in the short-term.

Reasonably foreseeable vegetation treatment strategies that are consistent with managing scenic quality on public land would be implemented. These treatments would be consistent with fire management goals and would reduce the risk of severe wildfire that could potentially affect all visual classes and visual scenic quality.

A decrease in high value visual resources is expected due to other actions. However, the Proposed Action could help offset the current fire management trend toward less natural landscapes and improve the prospects for visual resources in the long-term.

## NO ACTION

Cumulative effects from development of oil and gas combined with the impacts from No Action would be the same as those for the cumulative effects from the Proposed Action. Decreases in high value visual resources are expected due to other actions. The No Action would continue the current fire management trend toward less natural landscapes and would impact the maintenance of high quality visual resources in the long-term by incorporating suppression related linear features, such as firelines, on the landscape.

### **4.4.1.8 Naturalness, Solitude and Primitive Recreation**

## PROPOSED ACTION

Reasonably foreseeable increases in recreational use, growth and development, and implementation of the National Fire Plan would reduce opportunities for solitude and primitive recreation. Naturalness would be enhanced in the long-term as fire is allowed to play its natural role on more landscapes. This would omit the presence of large fire crews and other related intrusions.

Increased recreational use could likely reduce opportunities for solitude and primitive recreation offsetting that caused by the Proposed Action. Continued increases in the WUI and more people in general would likely influence the treatment methods in the long-term, which would affect the ability of fire to play its natural role.

## NO ACTION

Large scale implementation of the National Fire Plan and the BLM's Vegetation EIS would increase naturalness in the long-term, but the No Action Alternative would limit this increase to non-BLM lands. Increased recreational use may likely reduce opportunities for solitude and primitive recreation in addition to that caused by the No Action.

### **4.4.1.9 Forestry**

## PROPOSED ACTION

Community growth, resulting in increased WUI would contribute more acres to the areas where intense management of forests would be needed to protect property within the interface. Future development for mineral extraction may further reduce the acres of forests. There would be an initial gain in the availability of forest product harvesting opportunities through improved access. Increased recreational use may increase human-caused ignitions contributing to increased wildfires that reduce the biomass available for commercial use. Future development for mineral extraction may, along with the Proposed Action, decrease forest products available for use in some forested areas. However, the Proposed Action would reduce the effects from wildfires and contribute to the sustainability of forest products, offsetting some of the impacts from other foreseeable actions.

## NO ACTION

Future development for mineral extraction may reduce the acres of forests. There would be an initial gain in the availability of forest product harvesting opportunities through

improved access. Natural and human-caused ignitions would continue to ignite fires that would have an increased risk of causing severe effects on forestry and reduce biomass and forest product availability.

#### **4.4.1.10 Livestock Grazing**

##### **PROPOSED ACTION**

Cumulatively, implementation of the Rangeland Health Standards and Guides, BLM's Vegetation EIS and large scale implementation of the National Fire Plan would lead to improved rangeland health. These along with an incorporation of allotment resting periods following wildland fire and planned fire management actions would add to the increase in rangeland health. However, increased recreational use and continued spread of noxious weeds may impact grazing resources. The negative effects of noxious weed spread may be somewhat mitigated by the Proposed Action, as it would contribute to the overall improvement of health of grazing resources and make them more resistant to invasion for noxious weeds.

##### **NO ACTION**

Large scale implementation of the National Fire Plan on lands adjoining BLM-administered lands may offset the predicted increase in vegetative fuel load and the continued increase in the likelihood of severe wildfires moving onto BLM lands containing grazing allotments. Implementation of Rangeland Health Standards and Guides and BLM's Vegetation EIS, would eventually lead to improved rangeland health. However, the increase in fuel loadings from the No Action would reduce stability of grazing resources. Negative impacts from the spread of noxious weeds combined with the added risk of severe wildfires from the No Action could reduce health and productivity of grazing resources.

#### **4.4.1.11 Recreation and Visitor Services**

##### **PROPOSED ACTION**

Recreation may be affected from reasonably foreseeable actions. Increased recreational use and facility development, ongoing growth and development, wildfire, increase in vegetation treatments, increase in the WUI and noxious weeds would all change visitors' experiences.

Cumulatively, these effects, along with the Proposed Action may increase the susceptibility of recreational facilities, dispersed camping areas, trails, OHV routes and sanitation facilities to fire or fire suppression impacts. Increases or reprioritization of fuel treatment projects may be required to protect recreational resources. Long-term benefits include reduced fuel loadings leading to increased protection against wildfire, resulting in improved safety of recreationists.

The expected increase in recreation facilities would put a demand on fuel treatment funds. The opportunity to use these limited funds to do fuel treatments surrounding the recreation sites and facilities may be even more limited due to competition for funding with WUI areas. This could create greater impacts to recreation sites and facilities and to WUI areas trying to share funding.

## NO ACTION

The impact of agency priorities for the creation of developed recreation sites and the maintenance of existing sites would have the greatest impact on visitor day availability of developed sites and facilities. Noxious weed spread would be exacerbated by the No Action which could eventually lead to reduced recreational enjoyment.

### **4.4.1.12 Special Designations**

## PROPOSED ACTION

Reasonably foreseeable actions would lead to additional human pressure on special designations, an increase in noxious weed spread and the potential for human-caused fires to affect the areas as use increases.

The overall effect of the Proposed Action together with reasonably foreseeable actions on special designations would be to reduce potential impacts from wildfire, which would help maintain the naturalness of WSAs by allowing wildfire to play its natural role in the ecosystem, help protect the special qualities of ACECs and help to protect from invasion of noxious weeds. The Proposed Action would allow flexibility in management of fire and fuels to accommodate the increased use and impacts that it causes. Additionally, it would help to reduce the spread of noxious weeds.

## NO ACTION

Cumulative effects of No Action could lead to more intense suppression actions adversely impairing the unique values associated with these designations, continue the trend toward larger fuel buildups in and around special designation areas, damage historic, cultural or scenic values associated with special designations and have an adverse impact on management of these areas. These would all be exacerbated by the reasonably foreseeable actions and would contribute to the adverse effects the No Action has on special designations.

### **4.4.1.13 Socioeconomics (including WUIs associated with BLM lands and adjacent ownerships)**

## PROPOSED ACTION

Large scale implementation of the National Fire Plan and other vegetation treatments would cause a reduction in the cost of suppression, increased payroll benefits for non-fire and planned ignition treatments, protection of wildland-urban interface areas and their associated resources values, protection of forest products values, increased hunting license sales, and maintenance of air quality. A decreased long-term potential for severe wildfire would lead to increased firefighter and public safety and a reduction in catastrophic loss of property.

Reasonably foreseeable actions together with the Proposed Action would cause a short-term displacement of affected populations (from smoke and dust), reduction in payroll benefits for suppression forces, temporary loss of allotment use, altered transportation routes, disruption of subsistence activities and temporary increases in noise. A decreased long-term potential for severe wildfire would reduce suppression payroll.

Cumulatively, continued expansion of WUI, increase in recreational use of BLM lands, future development for mineral extraction activities and ongoing growth and

development throughout the planning area would put more pressure to protect resources within and outside of the WUI from wildfire. More people in the area potentially expose more of the public to the impact from fire management actions on adjacent BLM lands. The cumulative effects of the Proposed Action and reasonably foreseeable development scenario may result in additional payroll for planned management actions and its corresponding increase in agency expenses. Additional public response to the Proposed Action may cause alterations in proposed treatments, wildland fire use implementation and expansion of the WUI.

#### NO ACTION

Continued fire suppression in most areas would cause an increase in payroll benefits for suppression forces, particularly in the long-term with the increased potential for severe wildfire. In the short-term, current access and recreation would be maintained.

Other social and economic impacts include long-term reduction in the suppression payroll, risk to WUI areas and their associated resources values, increased risk of loss of forest products values, temporary reduction in game and hunting license sales through loss of habitat, reduction in air quality, temporary loss of allotment use and long-term increase in catastrophic loss of property.

Cumulatively, continued increase in WUI, increase in recreational use of BLM lands, future development for mineral extraction activities and ongoing growth and development throughout the planning area potentially exposes more of the public to large, severe wildfire and could increase the value of resources damaged by them. This would occur through the public's desire to aggressively suppress all wildland fires while not incorporating planned fuel treatments to lessen fuel loads.

